

**“Finally, a magazine  
for MIS management  
with an  
editorial environment  
that mirrors the  
corporate networking  
message of our  
ad campaign.”**

*Peter Simon  
Vice President, Marketing  
Banyan Systems*

NEWSPAPER

#630\*\*\*\*\* 5-DIGIT 48106  
#B0M2ZE300J069061# 0050110983

JOYCE BROWN  
UNIV MICROFILMS INTERNATL  
300 N ZEEB RD  
ANN ARBOR MI 48106

372

**COMPUTERWORLD**

SECOND CLASS

COMPUTERWORLD

focus  
on

# Integration

**A key source of information for  
corporate information strategists — and your key  
to this important buying audience!**

Making the right decisions for integrating their company's information system is the mandate of MIS management in 1989 and into the 1990s. With *Computerworld Focus on Integration* providing unique coverage of integration themes, these professionals now have a valuable resource to use in accomplishing this mandate.

Reach these integration strategists when they're reading the targeted editorial and thinking about the networking and software products and services they need to buy. Products and services needed to achieve successful integration of the corporate information system.

**"Integration Management"  
is the theme for June 5**

**Be there when IS management is reading about these  
important topics:**

**Cover Story: Integration changing the way business  
does business**

How advanced capabilities in integration technology allows businesses in three key industries to rethink and reorganize certain business functions.

**Budgeting and cost justification of integration**

How to measure the value of an integration project when networking is a key component — plus strategies on selling the integration budget.

**Strategic networking alliances**

Many companies are creating new business alliances that share data — what latest networking trends and strategies are evolving that give these alliances competitive value and edge in their marketplace?

**LAN security**

A proprietary survey on what factors are important to IS managers for PC LAN security, and what actions they are taking to protect their vital data.

**And be in the June 5  
Computerworld Focus on Integration to qualify  
for our charter advertising program.**

Advertise in the June *Computerworld Focus on Integration* and qualify for our charter advertising program throughout 1989. The charter rate is the same line rate as you currently apply to your regular contracted advertising in *Computerworld*, times the appropriate number of lines you run in *Computerworld Focus on Integration*. By applying this rate toward advertising in *Computerworld Focus on Integration*, you get a lower cost per line for every ad you run.

COMPUTERWORLD

focus  
on

## Integration

**June 5 Ad Close: May 5  
Bonus Show Distribution: PC Expo**

For more information contact Val Landi, Senior Vice President/Associate Publisher, at (508)879-0700 or your *Computerworld* sales representative.



# COMPUTERWORLD

## INSIDE

**Executive Report** — Top execs want to know what they're getting for their IS dollars. Page 55.

**In Depth** — How to avoid the pitfalls of systems integration projects. Page 71.

**In this issue** — *Computerworld* Focus on Integration



**Profile:**  
James Granier keeps banking systems in tune in The Big Easy. Page 49.

**Unisys projects loss**, joining IBM, DEC profit slide. Page 4.

**It's been two years** and a day since the PS/2 came out to play. But it took time making friends. Page 12.

**DEC readies Microvax** powerhouses in bid aimed at the underbelly of the AS/400. Page 7.

**Revived ethics**, not rewritten laws, seen as key to battling computer crime. Page 100.

**Adapso says it's on track** after staff chief takes separate path. Page 77.

**Slim Compaq system** invigorates 80286 lineup. Page 37.

**DBMS debate on object-oriented** technology not likely to kill off relational systems. Page 23.

## IBM pegs office as SAA proving ground

*Multiplatform package due within 90 days*

BY DOUGLAS BARNEY,  
WILLIAM BRANDEL  
and STANLEY GIBSON  
CW STAFF

IBM will take its most aggressive stab yet at providing true cooperative processing when it unveils a suite of SAA-compliant office automation applications this spring.

In the process, IBM will boost the importance of its strategically ill-defined and slow-selling OS/2 Extended Edition — an operating system containing data-

base and communications extensions that is a cornerstone of what is commonly referred to as SAA Office.

The new office automation system will include electronic mail, document preparation, decision support features and an iconic interface, IBM Vice-President Earl Wheeler said in a recent speech.

The suite of office integration applications will encompass versions for each major IBM operating system — OS/2, OS/400, VM and MVS — according to a

source with access to internal IBM information.

IBM has already hinted broadly at the SAA Office strategy. Just last week, Howie Hunger, director of software vendor operations at IBM's Application Systems Division, described an upcoming announcement at which a number of independent software vendors will be present. These vendors' products will ship this year, he said. He also indicated that an announcement will come within 90 days.

Hunger said the product will center on OS/2 Extended desktop devices performing coopera-

tive processing in Systems Application Architecture and connected to IBM Application System/400 and 370 hosts. "The desktop will contain the local data, and the host will be AS/400, 370 or a LAN server," he said.

The SAA-integrated package should mark the beginning of IBM's cooperative processing strategy and will serve as a front end to OS/2 servers, AS/400 software and the 370 family of mainframes. In the process, this software may begin to replace IBM's Professional Office Sys-

*Continued on page 6*

## Cornell: Morris set worm loose

BY MICHAEL ALEXANDER  
CW STAFF

Officials at Cornell University plan to make public today an exhaustive report that concludes that one of its students created and unleashed the worm that shut down thousands of computers on the nationwide Internet network last November.

Robert T. Morris Jr. allegedly used computers at Cornell to create the worm and inject it into the Internet network while attending the university as a computer science graduate student last fall. The worm multiplied uncontrollably, clogging the memories of infected computers until they could no longer function.

"The act of propagating the worm was fundamentally a juvenile act that ignored the clear potential consequences," the report said.

According to the university investigative commission that compiled the 170-page report, Morris was able to exploit secu-

*Continued on page 100*

## Career-switchers use IS as first step up corporate ladder

BY ALAN J. RYAN  
CW STAFF

There is something unorthodox about Patricia Wier and William McCartin. Sure, it makes sense that Wier, who holds a degree in English, is president of Encyclopaedia Britannica, U.S.A. And it is logical that William McCartin, a certified public accountant, is treasurer of Noxell Corp. But both of them got there through

information systems.

IS has always been a stepping-stone, be it to other IS jobs, vice-president of IS or even chief information officer. But it is increasingly proving to be a fertile breeding ground for leaders in all areas, said Jack Epstein, chairman of Maxi/Micro Consultants and a senior consultant at International Data Corp. It is all part of the growing trend to align the

*Continued on page 101*



Britannica's Wier made her way from the firm's IS department to the president's office

## Some users hack own Netview path

BY ELISABETH HORWITT  
CW STAFF

A version of IBM's Netview/PC for OS/2 Extended Edition is scheduled to hit the streets in less than a month — still too late to dissuade some users and ven-

dors from circumventing the interface and forging their own direct links to Netview.

Netview/PC workstations make expensive network management liaisons and add many potential failure points to users' networks, according to those

who have turned away from IBM's product.

Netview/PC Release 1.2, announced last fall and scheduled to become commercially available May 2, brings greater memory and multitasking to the job of interfacing non-IBM networking devices to the vendor's host-based network management system. The existing PC-DOS-based Netview/PC Version 1.1 has come under fire from vendors and users alike for its inability to handle more than one networking application at a time.

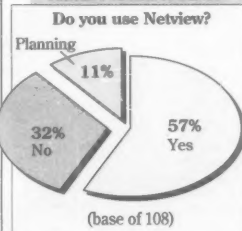
United Airlines subsidiary Covia, Inc. has been pressuring MCI Communications Corp. to drop Netview/PC from MCI View, a service that sends alerts and alarms about Covia's communications lines to a Netview host. According to Covia technical systems development engineer Kenneth Cieszynski, "Part

*Continued on page 10*

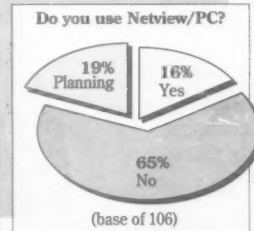
### Cautious approach

While IBM's Netview has gained a dominant position among surveyed sites using network management, Netview/PC has had more limited success

PERCENT OF RESPONDENTS



SOURCE: TFS COMM/SURV



CW CHART: JOHN YORK

# IN THIS ISSUE

## NEWS

- 4 Businessland "Next" in line to distribute Unix workstations to corporations.
- 4 Softened computer hardware and software demands lead to hard losses.
- 6 Spandex computer glove comes in handy for keyboard applications.
- 6 MIT's Cray purchase ends "Buy American" battle.
- 7 DEC hopes to take a chunk out of AS/400 line with Microvax upgrade.
- 7 Apple claims it has a sharp edge in host connectivity.
- 8 IS team goes to bat for Major League Baseball.
- 10 Humane Society unleashes adopted dogs with a chip on their shoulders.
- 12 After two turbulent years, IBM's PS/2 is finally a force to be reckoned with.
- 14 IBM joins hands with Microsoft, Intel to develop CD-ROM standard.
- 100 Strong laws, weak ethics form an unshapely computer security physique.
- 100 FBI sees no need to increase computer awareness of agents.
- 101 Computer crime is an equal opportunity employer, research firm says.

## Quotable

**"We are being asked new questions. Executives at the top want to know why IS is getting to be so big and whether we are getting a real payoff from it."**

JAMES SUTTER  
ROCKWELL  
INTERNATIONAL

*On the need to find new ways to cost-justify IS investments. See story page 55.*

## SYSTEMS & SOFTWARE

- 23 Object-oriented technology proponents kick sand in RDBMS supporters' faces.
- 25 Insurance firm ditches prehistoric-like MV/10000 for top of Data General line.

## PCs & WORKSTATIONS

- 33 Groupware is sweeping PC users off their feet.
- 37 Informix Software flaps spreadsheet Wingz.

## NETWORKING

- 45 Boeing gives MAP the cold shoulder, chooses Decnet instead.

## MANAGER'S JOURNAL

- 49 Arthur Young suggests a top-down EIS sales approach.

## COMPUTER INDUSTRY

- 77 Analysts question the direction in which the Novell-Excelan merger is heading.

## EXECUTIVE REPORT

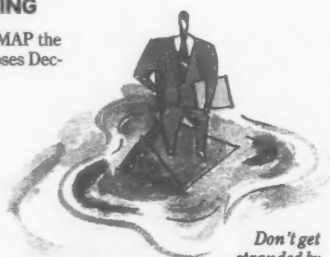
- 55 Corporate patience is wearing thin with rough estimates of IS payback.

## IN DEPTH

- 71 Managing complex systems integration efforts may be one of the toughest jobs IS ever faces. By Daniel W. Gaskill.

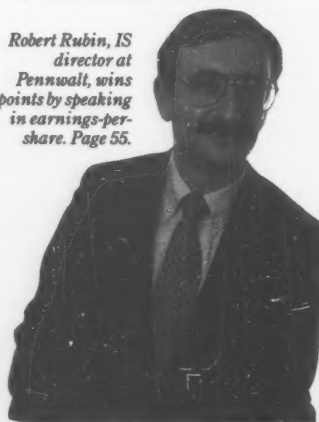
## DEPARTMENTS

- 8 News Shorts
- 16 Editorial
- 18 Book Reviews
- 82 Computer Careers
- 91 Marketplace
- 97 Training
- 99 Stocks
- 102 Trends



*Don't get stranded by systems integration.*  
Page 71.

Robert Rubin, IS director at Pennwalt, wins points by speaking in earnings-per-share. Page 55.



JOHN MARTINI

## UPDATE

**A**nniversaries this month: Following the lead of sky-jacker D. B. Cooper, 15 years ago a disgruntled Oregon state worker "commandeered" an IBM 370 via a remote terminal and crashed the system. One year later, the first public warning of the coming microprocessor revolution was issued, but alas! the poor forecaster was jeered. And one year after that, a U.S. representative charged that the Social Security Administration was "hoarding" IBM 370s. Just how big were the closets back then?

# EXECUTIVE BRIEFING

■ **Still cost-justifying your IS investments?** The old models probably won't work anymore. With corporations looking more closely at their computing expenditures, IS managers are seeking new ways to quantify the value of what they do. Grumman puts strategic planning to work to slow the computer-cost spiral and get more for its IS dollar, while Merrill Lynch keeps a lid on expenses by bringing users more closely into the process. Stories begin on page 55.

■ **IBM's first major SAA application** is set to be announced soon. It will include a set of office functions such as E-mail and decision support that runs across mainframe, mini and PC platforms and transparently exchange files. Officials say the so-called "SAA Office" is tailor-made for users with multiple hardware platforms. Page 1.

■ **Information systems can be a springboard** to top management positions, some pros find. But success usually means putting in extra hours and getting deeply involved with the business. Page 1.

■ **When systems integration projects fail**, it's usually because of poor problem definition, insufficient knowledge of the application or communications lapses. Use steering committees to make requirements clear, find a technical person who knows the application and keep a knowledgeable end user close to the project to avoid the pitfalls. Page 71.

■ **Find an executive sponsor** to help you sell executive information systems to your top management, a recent Arthur Young report says. Page 49.

■ **One of the earliest strategic IS projects** is moving up. Baxter Healthcare's purchasing network, known in the IS world as the American Hospital Supply system, is migrating from terminals to PCs as customer ordering devices at more than 6,000 U.S. hospitals. Page 33.

■ **More Microvaxes are on the way**, and DEC is hoping these newest souped-up models will take some steam out of the AS/400 express. Page 7.

■ **Response-time relief** comes to a North Carolina insurance organization, one of the first users of Data General's new high-end computer. Response times dropped from 45 seconds to four seconds. Page 25.

■ **Put yourself in the user's place.** You don't expect your hardware vendor to simply walk away after the sale. Do users deserve any less consideration when you deliver an application to them? Page 17.

■ **EDS safeguards** its worldwide network with a billion-dollar central facility in Texas. The project is intended to keep the EDSnet network going 24 hours a day and centralize operations, maintenance and engineering. Page 12.

■ **How about renting that PC instead?** More companies are doing just that to avoid obsolescence and handle spot computing needs. Good news: Increased competition is forcing rental rates down. Page 91.

■ **An early MAP supporter** went with Decnet instead: Boeing cites established products, off-the-shelf software as driving forces in its decision to give DEC a major contract. Page 45.

■ **Short takes:** You'll be able to buy that whiz-bang Next machine without going to college after all. But it will cost \$10,000 at Businessland stores, page 4... Start-up releases an input device that you wear like a glove while moving items on screen by hand, page 6... Women and minorities are more likely to commit computer crimes than you may think, and current and former employees are your biggest security threat, according to a new study, page 101... Nine out of 10 executives use PCs, a Fortune survey finds, page 102.

Systems software for MVS data centers:

# Enter the world of total solution, total support.

Computer Associates announces an integrated, total software solution for MVS data center automation: **CA-UNICENTER™/II MVS**. It consists of the following **CA-UNIPACK™** modules:

**SECURITY, CONTROL AND AUDITING (SCA)**

Access control, network security, system audit.

**DATA CENTER ADMINISTRATION (DCA)**

Problem control, change management, inventory and financial control.

**AUTOMATED PRODUCTION CONTROL (APC)**

Automating, job scheduling, console operations, print management, report distribution.

**STORAGE AND RESOURCE MANAGEMENT (SRM)**

Tape and DASD management, sorting, disaster recovery.

**PERFORMANCE MEASUREMENT AND ACCOUNTING (PMA)**

Capacity planning, network management, performance measurement, resource accounting, system analysis.

**CA-UNIPACKS** are groups of advanced products working together to automate major functional areas of the data center. You maximize productivity when you install all **CA-UNIPACKS** to create **CA-UNICENTER/II MVS**.

Only Computer Associates has the products and expertise to provide MVS data centers with such a cost-effective, total solution.

And only Computer Associates offers **CA-UNISERVICE™/II**, a secure link between your mainframe and CA's Customer Service System 24 hours a day. You get online access to software fixes, interactive problem resolution, plus product tutorials and more!

Enter the world of total solution, total support.

Call Dana Williams today  
**800-645-3003 (Ext. 0016)**

**COMPUTER  
ASSOCIATES**  
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 100 offices.

Resource & Operations Management • Financial • Banking • Graphics • Spreadsheets • Project Management



# Next goes retail at premium price

BY JULIE PITTA  
CW STAFF

SAN FRANCISCO — There has been a change in plan at Next, Inc. — its Unix workstation is no longer just for college users. The firm outlined plans here last week to sell the system — with a significant markup — to corporate users through Businessland, Inc.

Six months ago at the introduction of the firm's first system, Next Chairman and President Steve Jobs said the machine would be available only to institutions of higher education.

With Businessland, "Jobs is going back to the people who brought him into the corporate market in the first place," said Richard Schaffer, editor and publisher of "The Computer Letter." Businessland is considered the retailer most responsible for selling Apple Computer, Inc.'s Macintosh to large firms.

Businessland President Dave Norman predicted the Next system will be a best-seller, exceeding \$100 million in sales during the first year. "We believe our sales of Next over the next 12 months will be as great as sales

of Compaq were over the last 12 months," Norman said. Compaq Computer Corp., which recently dropped Businessland, accounted for \$150 million of Businessland's \$1.2 billion in sales last year, he noted.

The Next workstation has sold for \$6,500 to universities, and 1,000 units have been shipped since deliveries began 90 days ago. The workstation will sell for \$9,995 through Businessland.

Acceptance of Unix outside technical environments has been slowed by a lack of general-purpose personal computer software. Next officials said Lotus Development Corp. and Aldus Corp. have committed to developing products for Next. Additionally, Novell, Inc. will port Netware, its local-area network software, to Next, giving it the ability to tie into IBM Personal Computer and Macintosh LANs. As yet, there are no release dates for those products.

Before the press conference, Ashton-Tate Corp. and Apple spin-off Claris Corp. had been said to be developing for Next. Claris Marketing Vice-President John Zeisler said Claris staff re-

cently attended a developer's camp hosted by Next but has not made a firm commitment to develop for the system.

Next will sell exclusively to Businessland, according to the retailer, and it will be the first Unix-only workstation it will sell. Businessland also said it will sell AIX, IBM's version of Unix, for its Personal System/2 line, and A/UX for the Macintosh.

Jeff Mason, IBM's director of

Businessland carried the RT three years ago but dropped it less than a year ago. The firm has been evaluating other Unix workstations for more than a year.

Among the firms said to have been considered is Sun Microsystems, Inc., long rumored to be interested in the retail channel. However, sources said that Sun would not offer Businessland exclusive rights to its products.



ROBERT HOLMGREN

**Next's Jobs opens up his workstation to a new market**

advanced workstations and AIX systems, said that the PS/2 provides users with a low-cost alternative to the IBM RT, which already runs AIX. "The PS/2 offers you a lower priced entry point to AIX than the RT does, so it would be attractive to people who don't need the power of an RT," Mason said.

Shaffer predicted that the Next-Businessland relationship will prove fruitful for both parties. "There's no question they'll do the volumes they're talking about," he said. "With the size of Businessland's sales force, each salesman would only have to sell about one machine a month to make it happen."

## Downturn seen as no cause for panic

BY NELL MARGOLIS  
CW STAFF

Industry analysts kept a stiff upper lip last week even as Unisys Corp. became the third major hardware vendor to forecast lower first-quarter earnings.

Softening demand for computer hardware and software, blamed for recent earnings slides, portends an industry shift but not a collapse, they said.

Unisys tagged its coming loss, now estimated in the \$60 million to \$80 million range, to three factors:

- A freeze in orders of an older family of mainframes as customers awaited a new line.
- The suspension of certain defense-related contracts.
- The high cost of the company's recent reorganization.

In addition to these "unusual first-quarter disruptive factors," Unisys cited "the continued industrywide weakness in the U.S. computer business" as responsible for the disappointing earnings report.

"Absolutely, there is a weakening of U.S. demand," said Uric Weil, an analyst with Weil & Associates in Washington, D.C. Government figures on factory orders released late last week marked the biggest drop since

last July, with nondefense-related capital goods taking the hardest fall. "The information technology sector has grown too big to be immune to macroeconomic shifts," Weil noted.

However undeniable, he added, the trend is not irreversible. With rare exceptions, senior management has seen little quantifiable payoff from big investments in information technology to date. The result, Weil said, is extreme caution about where — or even whether — the next technology dollars will be spent.

Another roadblock for decision makers is the profusion of choices at every level, from products to protocols to philosophies, noted John Imlay, chief executive officer of Management Science America, Inc.

"Demand remains," Imlay said, "but it's complicated by confusion and frustration."

In addition, said Dale Kutnick, president of Meta Group, Inc., a market research firm based in Westport, Conn., there has been little reduction in the prices of large systems. This fact further contributes to what Kutnick called "a minor slowdown in the industry, but nothing to panic about." Many of the individual circumstances that companies

— prominently, IBM, Digital Equipment Corp. and Unisys — have claimed as responsible for their faltering earnings are attributable not to changes in buying patterns but to changes in users, Kutnick contended.

Increasingly sophisticated and demanding users, he said, "are not willing to buy promises

any more. There's plenty of demand out there, but only for the right products."

Vendors, he explained, are just now waking up to the fact that, while yesterday's users could be sold, today's demand to be satisfied. Invariably, he added, they are finding that waking up is hard to do. This accounts for the product-transition woes that are hobbling Unisys and still slowing IBM and DEC.

### CORRECTIONS

The Irix operating system is a trademark of Silicon Graphics, Inc., not Control Data Corp. as reported [CW, Feb. 27].

It was incorrectly reported that AT&T is phasing out its Information Systems Network (ISN) in favor of its Datakit II Virtual Communications System [CW, March 20]. While users can migrate from its ISN switch to the Datakit II, AT&T said it "has no plans to discontinue ISN."

Infodata Systems, Inc. is located in Falls Church, Va., not at the location reported in the article "Text retrieval finds its home" [CW, March 20].

It was incorrectly reported that Andor Systems, Inc. will not introduce a low-end mainframe as

originally planned [CW, March 27]. Andor is continuing development of its mainframe CPU but also said it plans to use it in a storage product that will be introduced before the mainframe is completed.

Knowledgeware, Inc.'s IEW/Gamma, a full life cycle computer-aided software engineering (CASE) package running on IBM and plug-compatible mainframes, and IEW Construction Workstation, also a full life cycle CASE product for the IBM Personal Computer, AT, Personal System/2 and compatibles, should have been listed in the Spotlight vendor chart of back-end CASE tools [CW, March 27].

In the same Spotlight chart, the phone number for Quantitative Technology Corp. should have been 503-626-3081.

## COMPUTERWORLD

**Editor in Chief**

Bill Laberis

**Executive Editor**

Paul Gillin

**News Editor**

Peter Bartolik

**Assistant News Editor**

James Connolly

**Senior Editors**

Clinton Wilder, Management  
Elizabeth Horwitz, Networking  
Patricia Keefe, Networking  
Douglas Barney, PCs & Workstations  
Stanley Gibson, Software  
Michael Alexander, PCs & Workstations  
Rosemary Hamilton, Systems  
Neil Margolis, Industry

**Senior Writers**

Alan J. Ryan

Amy Cortese

William Brandel

**Staff Writer**

James Daly

**New Products Writer**

Sally Cusack

**Features Editor**

George Harrar

**Senior Editors**

Glenn Rifkin

Joanne Kelleher, Spotlight

and Executive Report

Michael L. Sullivan-Trainor,

Special Projects

**Senior Writer**

David A. Ludlum

**Associate Editors**

Deborah Pickling

Kelly Shea, In Depth

**Assistant Editor**

Sharon Baker

**Researchers**

Bonnie MacNeil

Kevin Burden

**Chief Copy Editor**

Mary Grover

**Assistant Chief Copy Editor**

Donald St. John

**Features Copy Editors**

Julie L. Cook

Joseph J. Patton

**Copy Editors**

Cathleen A. Duffy

Richard R. Pastore

Joyce Chutchan

Carol Hildebrand

**Art Director**

Nancy Kowal

**Graphics Specialists**

Frank C. O'Connell

John B. York

**Graphics Researcher**

Laura O'Connell

**Assistant to the Editor in Chief**

Linda Gorgone

**Editorial Assistants**

Patricia Faherty

Lorraine Witzell

Megan Santorus

**Rights and Permissions Manager**

Sharon Bryant

**News Bureaus**

**Mid-Atlantic**

201/967-1350

Robert Moran, Correspondent

**Washington, D.C.**

202/347-6718

Mitch Betts, Bureau Chief

**West Coast**

415/347-0555

Jean Boman, Bureau Chief

Julie Pitta, Senior Correspondent

J.A. Savage, Correspondent

Patrick Waurzyniak, Correspondent

Mary Elliston, Editorial Assistant

**Midwest**

312/827-4433

Ellis Booker, Correspondent

**Computerworld Focus on Integration**

**Editor**

Ann Dooley

**Managing Editor**

Lory Zottola

**Senior Editor**

Stan Kolodziej

**Senior Writer**

Helen Pike

**Art Director**

Tom Monahan

**Ink**

Mark Bresbart

**IDG News Service**

Kathleen A. Gow, Director

**Main Editorial Office**

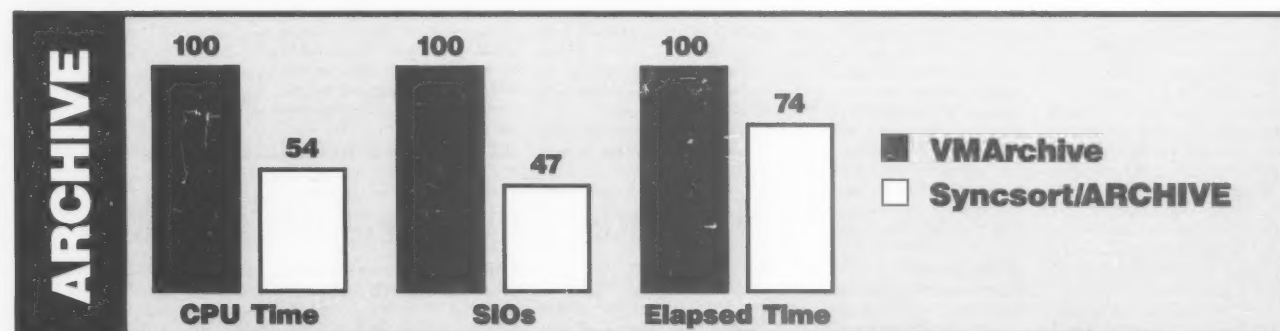
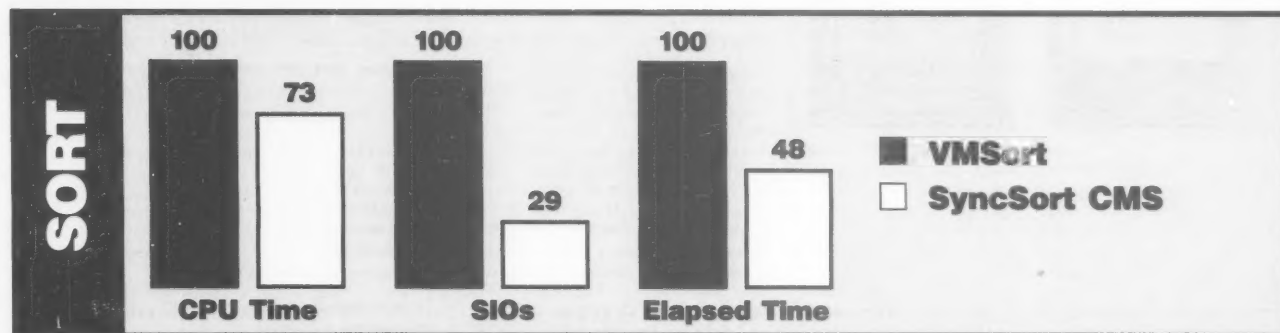
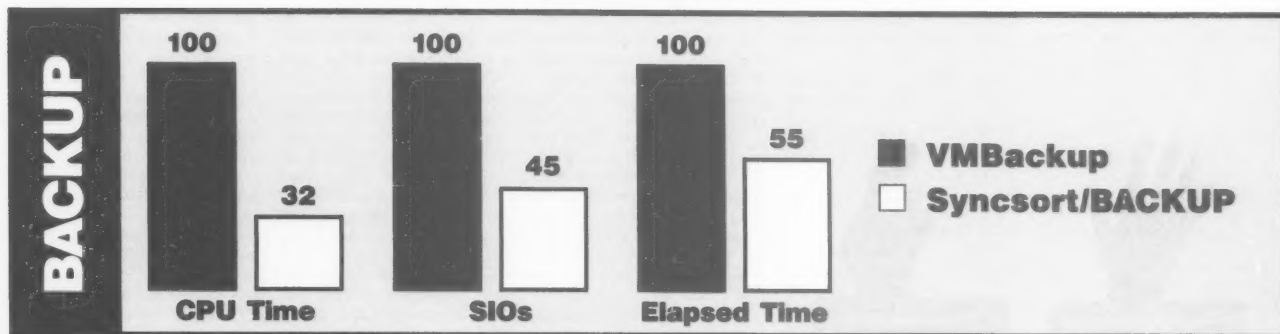
Box 9171, 375 Cochituate Road

Framingham, MA 01701-9171

508/879-0700

Subscriptions: 800/669-1002

# VM PERFORMANCE FROM SYNCSORT



**Deal your system a winning hand.**

To arrange for a test on your system, call us at (201) 930-8200, and see what VM performance from Syncsort can do for you.

**syncsort**  
INC.

**WHERE PERFORMANCE IS THE ISSUE.**

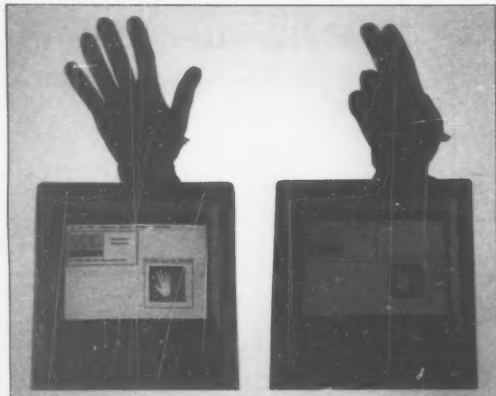


# Spandex Dataglove: A handy PC tool

BY JULIE PITTA  
CW STAFF

REDWOOD CITY, Calif. — All it takes is sleight of hand.

The black spandex glove isn't likely to send droves of teenagers to nearby shopping malls.



ROBERT HOLMGREN

## What you can do with gloves on

But it might become trendy with computer users. No mere ornament, the glove is a computer input device created by Silicon Valley start-up VPL Research. For some applications, it could replace traditional input devices such as keyboards and mice.

Researchers at MIT's Media Lab were among the first to experiment with the glove. Using Hewlett-Packard Co.'s 825 SRX workstation as a hardware platform, the lab created three-dimensional graphics software to work with the device. Three-dimensional objects stand stationary until the animated hand — following that of the gloved researcher — grabs a computerized image and hurls it. The ball flies across the screen at a speed and distance dictated by the laws of gravity, as mandated by the software program.

"With traditional computer-aided design, you have to decide what will happen to the object you're working with, and then the computer illustrates it," MIT computer researcher David Sturman said. "The idea here is that you don't know what's going to happen."

Slip it on and the Dataglove creates a kind of computerized magic. Hold your hand up to the computer display and an animated likeness of it appears on screen. Make a fist and the animated hand clenches. Point your index finger and it duplicates the gesture in real time.

Residing on the Dataglove are optical sensors on each of the 10 major joints of the hand. A polhemus, which looks like a plug

on an electrical cord, is attached to the glove. The polhemus creates the magnetic field so that the computer can identify the actual location of the glove and monitor its movements.

The glove and polhemus are then connected to an external

box the size of a personal computer base via a fiber-optic cable. The box, or glove control unit, performs analog-to-digital conversion so optically recorded impulses sent to it can be translated into data and transformed into images by the workstation.

VPL's team is hoping that the glove is adopted by more than the computer elite. Before it sees more general use, its price — \$8,000 — will have to come down, and there will have to be applications software to take advantage of its capabilities. "It brings the computer to meet the person's way of working, rather than the person having to meet the computer's way of working," said Dataglove inventor and VPL President Jaron Lanier.

## Down to earth

The glove is not as futuristic as it may appear. VPL has created a version that will replace a joystick used in Nintendo video games. Mattel, Inc.'s Power Glove will sell for \$75 next fall.

Creation of the glove was originally funded four years ago by the NASA Ames Research Center in Mountain View, Calif.

NASA Ames is using the Dataglove in a robotics experiment. A human operator wears it and a computerized helmet equipped with two small LCD screens near the operator's eyes.

On the screen is an image of a robot at a remote site. Movement of either the hands or the head activates the robot. An optical camera at the site will pick up impulses from the operator and send it to the robot.

## SAA

FROM PAGE 1

tem as the office communications system of choice for large IBM customers, analysts said.

Users on all three architectures will be able to exchange documents and messages transparently without consciously switching from one office automation environment to another, said John Dunkle, vice-president of Workgroup Technologies, a Hampton, N.H.-based market research firm.

On the user side, there is a two-pronged strategy. SAA Office applications will run as text-based applications on IBM 3270-style terminal devices and will not look or feel like the Presentation Manager, according to the source knowledgeable about IBM's plans.

The terminal-based applications will also be unable to implement cooperative processing techniques because existing terminals have little or no intelligence. Within IBM, the source said, "The strategic thrust is Presentation Manager." It is not clear how effectively terminals will be able to work with personal computer.

On IBM Personal System/2-style machines, SAA Office applications run under the OS/2 Presentation Manager and also require key elements of OS/2 Extended Edition. Prior to loading SAA Office on a workstation, users must load OS/2, Presentation Manager and OS/2 Extended's Advanced Program-to-Program Communications (APPC), local-area network-oriented file and print redirectors and portions of the Data Manager, the source said.

Analysts speculated that to supply a Presentation Manager-compliant user interface for host-attached devices at a reasonable price, IBM will have to

introduce so-called "intelligent workstations" that are essentially diskless PS/2s.

Such devices would need to be priced close to \$2,000, according to Dale Kutnick, an analyst at Meta Group, Inc. in Westport, Conn. At press time, no definitive information was available on a possible hardware announcement tied to SAA Office.

A PS/2 or intelligent workstation calls into memory the bulk of the user application from a server. The back-end server contains documents, files, mail and program code, all of which sit in relational databases, the source said. Observers pointed to OS/2 Extended, SQL/DS, DB2 and OS/400 as likely targets. The client workstation requests data or documents from the host using APPC.

"If you are accessing a document, the library services that store-and-forward and handle the document will be on the serv-

er," the source said. This server could be an AS/400, a 370-style mainframe or a PC-based LAN Server. "You also have programs on your workstation that get the document from the server," the source said.

To accomplish this task, IBM programmers have built a set of services that work with APPC to provide common access to the firm's different platforms. For example, there will be a common way to request mail that works with all three levels of supported hardware, the source said.

Customers and third parties will also be able to use these services to develop their own cooperative-style applications. For example, a mainframe spreadsheet could run largely on the host with Help files and the user interface residing on a PC. Trax Software has designed its spreadsheet for such an architecture, said Tom Cox, director of marketing at Trax.

## Integration appeal

As an example of office automation functions and business applications being integrated, John Birch, head of midrange systems development at McCormack & Dodge Corp. in Natick, Mass., pointed to the integration of M&D's Millennium financial packages with Digital Equipment Corp.'s All-In-1. He said a Millennium report can be joined with a WPS Plus document and the result sent via electronic mail. Birch suggested that such capabilities would be likely with Millennium and an SAA Office product.

Richard Crandall, president and chief executive officer of Comshare, Inc., a maker of executive information software (EIS), said his firm will soon announce an enhancement to Commander. Readmail will send annotated EIS screens to IBM's Professional Office System. "Those facilities will be integrated into any other IBM office automation product," he said.

The common-user interface implemented in SAA Office workstations has great appeal for Phyllis Koch, supervisor of the advanced technology center at Ryder Truck Rental, Inc. "The whole idea of SAA has tremendous appeal. I work on PCs, Application System/400s and even mainframes. I never know what key I'm pushing, and I'm in MIS," she noted.

## MIT ends 'Buy American' battle

BY JAMES DALY  
CW STAFF

CAMBRIDGE, Mass. — A little federal arm-twisting can go a long way. Just ask MIT.

When the school confirmed recently that it is drawing up final plans for a Cray Research, Inc. Cray-2 supercomputer, it cooled a "Buy American" battle that has simmered between MIT and the federal government for nearly 1½ years.

The dual-processor machine, which could arrive as early as June, is expected to serve several dozen MIT faculty members and sweeten the school's draw for faculty and graduate students, said Kenneth Campbell, director of MIT's news office.

But trouble developed soon after school officials began shop-

ping around for a supercomputer in late 1987. Several companies' machines were initially considered, including ones from Cray, ETA Systems, Inc., Fujitsu Ltd. and NEC Corp., Campbell said.

Word leaked out that the Japanese firms were prepared to offer MIT some very attractive incentives. Both companies habitually offer large discounts to Japanese schools. A contract with the school would not only provide an extremely large feather in either company's cap but also would gain the victor a significant toehold in a large educational institution.

Word drifted down to Washington, D.C., and the U.S. Department of Commerce, where then-acting Secretary Bruce Smart dashed off a letter to MIT President Paul Gray. Smart said

he had no objections to shopping around but reminded Gray that any special deal the Japanese might cut could be subject to antidumping proceedings.

MIT realized it was being faced with an offer it couldn't refuse. "It became clear that important elements of the federal government would prefer to see MIT acquire a supercomputer based on U.S. technology," MIT Provost John Deutch said.

Deutch conceded that the federal government would ultimately bear nearly all of the cost for the machines through research grants to MIT. Therefore, "the preferences of the U.S. government must be seriously assessed," he said.

Negotiations with Fujitsu and NEC were subsequently suspended.

# Microvax upgrades to aim at AS/400

BY JAMES DALY  
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. is hoping to take a bite out of the high end of IBM's successful Application System/400 line next Monday when it adds two souped-up models to its popular Microvax 3000 series, according to sources close to DEC.

Analysts claim the Microvax 3800 and 3900, along with the concurrent rollout of a solid-state storage system, stand a good chance of crawling through a recently opened midrange window of opportunity.

While pent-up demand caused explosive early interest in the 10-month-old AS/400, the initial ordering wave has crested and broken, resulting in a lull that DEC hopes to exploit with the new Microvaxes.

Both models are expected to use the same CMOS microprocessor as the VAX 6300, providing a processing speed of 3.8 million instructions per second. The 3800 and 3900 will have base prices of \$61,000 and \$120,000, respectively, said Marc Schulmann, an analyst at UBS Securities, Inc.

If the duo proves to be dynamic, it

could help DEC wake from its fiscal slumber. Company officials warned recently that weak domestic sales will result in third-quarter revenue being lower than expected.

## Desktops offer slim profits

A recent flurry of competitively priced introductions for the desktop will do little to change that predicament, observers said, because those models are aimed at stemming the outflow of DEC users to other vendors and offer only slim profit margins. The Microvax line, however, enjoys much higher margins. If successful, the

3800, 3900 and solid-state storage system could significantly stoke DEC's financial furnace.

The new models could also be the last uniprocessor-based Microvaxes, said John Logan, an analyst at The Aberdeen Group research firm.

Analysts predicted that DEC will trumpet the machines as on-line transaction processor (OLTP) front-end processors in much the same way that the Microvax 3300 and 3400 were touted upon their introduction last October.

"OLTP is one area where the AS/400 has thus far not set the world on fire, and the 3800 and 3900 could make a very effective argument there," said Terry Shannon, director of the DEC Advisory Service at International Data Corp.

# Apple claims to have an edge in host connectivity

BY ELLIS BOOKER  
CW STAFF

CHICAGO — While it cannot supplant the mainframes that dominate corporate America, Apple Computer, Inc. claims it can offer superior ways to access, process and present the information contained in those host computers.

That was the message to Midwest users at the two-day Macintosh Connectivity Conference here last week. Meanwhile, there was strong evidence that Apple will plug some holes in its connectivity product line in June.

"The Macintosh adds value as a front end and personal workstation for corporate information," said Morris Taradasky, vice-president of customer services and information technology at Apple USA, in his keynote speech. Illustrating his remarks with a Macintosh demonstration, Taradasky reviewed Apple's various links to the non-Apple world.

"Connecting into MS-DOS and OS/2 environments is also a priority for Apple," Taradasky said, perhaps obliquely referring to the rumored, long-awaited announcement from Apple of a Token-Ring adapter for the Macintosh. Currently, the Macintosh cannot link directly to a Token-Ring network, although it can be bridged to these networks using third-party products such as Novell, Inc.'s Netware.

Apple sources confirmed that the company has scheduled a multiproduct announcement for June on the East Coast, but Apple executives refused to confirm any product plans.

"We will solve that problem [of the Token-Ring card]," said Charley Pitcher, Apple's systems software manager of U.S. product marketing.

In the exhibition area, a vendor said his company had been told by Apple to "be ready to participate" in a June announcement. The vendor — one of 32 showing Macintosh connectivity products — said an upgraded version of Appletalk will also debut in June.

The source, who asked not to be identified, said the new Appletalk will facilitate more connections to devices but will not increase the product's often-criticized 230.4K bit/sec. speed.

## VSAM DATA COMPRESSION Without the CPU Overhead

IAM REDUCES THE SIZE OF YOUR VSAM FILES BY 30 TO 70%

### IAM'S FILE STRUCTURE — SAVES 20 TO 40%

IAM uses an advanced file structure which is far superior to VSAM. IAM's supercompressed index, freespace concepts and block sizes make much more efficient use of disk space.

### IAM'S DATA COMPRESSION

#### SAVES AN ADDITIONAL 20 TO 50% DASD SPACE

Most files contain records with unused fields or repeating sets of characters. When IAM applies its proprietary compression techniques, the result is an additional 20 to 50% reduction in file size.

IAM's CPU time is dramatically less than competing compression products. In fact, since IAM's CPU time is normally much less than VSAM, IAM with data compression takes less CPU time than normal VSAM processing.

### TRANSPARENT

Online systems (CICS), BATCH jobs, TSO, SMP/E and other applications make extensive use of key indexed VSAM (KSDS) files.

IAM is a transparent alternative to VSAM KSDS files, which substantially reduces the impact of VSAM processing in your installation. There are no modifications to programs or JCL to use IAM files in place of VSAM.

### AUTOMATIC RELEASE OF UNUSED SPACE

IAM takes the guessing game out of VSAM space allocation. Large amounts of disk space are wasted when users overestimate how much space VSAM requires or how many records a file will contain. VSAM cannot release overallocated space.



## FREE VSAM SPACE SAVINGS ANALYSIS\*

DATA SET NAME	SPACE SAVINGS		VSAM TRKS		IAM TRKS		% SAVINGS		TOTAL RECORDS	AVERAGE LARGEST	MAX LRECL
	ALLOC	USED	STD	COMPR	STD	COMPR	STD	COMPR			
BIG.CLUSTER	37155	37155	27855	15600	25	58			4754670	233	580
										502	
CICS.FILE.MASTER	21000	19005	12720	9495	33	50			5088165	150	150
TABLE.CLUSTER										150	
NAME.ADDRESS.FILE	9315	8885	6465	1875	28	79			428529	680	2080
										2080	

The VSAM simulation report displays the current size and data characteristics of your VSAM files and how much space IAM will save you with and without data compression.

\*To see your VSAM usage, send for INNOVATION's free VSAM reporting programs.

Call for a Free No Obligation  
90 Day Trial

Supports MVS, MVS/XA and MVS/ESA

Makers of FDR and ABR

**INNOVATION**  
DATA PROCESSING

275 Patterson Avenue, Little Falls, NJ 07424 • (201) 880-7300

## NEWS SHORTS

### Prime and MAI each claim a win

Prime Computer, Inc. and its would-be acquirer, MAI Basic Four, Inc., both claimed victory last week after a federal appeals court upheld an earlier district court order continuing an injunction against MAI's tender offer for Prime. The ruling marked at least a temporary win for Prime in the tangle of take-over-related legal actions in which the companies are enmeshed. However, MAI has said it will disclose the information that the appeals court said is necessary to vacate the injunction.

### Animation wins an Oscar

Pixar of San Rafael, Calif., is claiming the first Academy Award for a computer-animated film. Two Pixar employees, John Lasseter and William Reeves, received statues in the Best Animated Short Film class last week for *Tin Toy*, a five-minute film about a baby and a toy. "It didn't look like a home movie, but it didn't have the bright colors or hard angles usually associated with animation. The baby was fat, soft and round," said a spokeswoman about the film's attempt at photorealism.

### Sematech produces first wafers

Sematech finished its first lot of semiconductor wafers last week, beating its deadline by three days. The lot was produced less than a year after Sematech set up shop in Austin, Texas. Sematech, a consortium dedicated to semiconductor production, hopes to identify production line efficiencies for its member companies. The consortium includes such computer vendors as Digital Equipment Corp., IBM, Hewlett-Packard Co. and NCR Corp. as well as major chip makers Intel Corp., Motorola, Inc. and National Semiconductor Corp.

### Net standard advances

The Open Systems Interconnect/Network Management Forum last week submitted draft specifications to its members for Application Services, the next major piece of OSI-based network management to be proposed by the 59-vendor consortium. The document defines message sets that, if adopted by vendors, would ensure that their network management systems would be able to exchange fault and configuration management information using OSI protocols. In addition, the Forum also announced that Societa Finanziaria Telefonica S.p.A., an Italian telecommunications firm, has become its 14th voting member.

### Pilot expands with Thorn EMI pact

Boston-based executive information systems vendor Pilot Executive Software last week reached agreement to buy the U.S. operations of worldwide decision support systems firm Thorn EMI Computer Software, a subsidiary of British giant Thorn EMI. The deal blasts Pilot from a customer base of 150 to one of 800 U.S. organizations and coincides with Pilot's introduction of support for the IBM MVS environment, according to the company.

### Remote troubleshooting for 3Com

Users of 3Com products will gain remote on-line access this week to 3Com service engineers who will troubleshoot 3Com networks. Customers with 3Com Infoline, Express and Guardian service contracts will receive free software designed to allow 3Com to manage and tune user networks.

### Fiber net packs 100M-bit speed

Simple Net Systems, Inc. said it has shipped the first commercially available 100M bit/sec. Fiber Distributed Data Interface (FDDI) network for Intel Corp. 80286- and 386-based micros. Laserlan Plus uses Advanced Micro Devices, Inc.'s Supernet FDDI chip set and features a full-size 16-bit adapter card with 128K bytes of on-board packet buffer memory, a 125M bit/sec. transmission rate, Novell, Inc. Network drivers and a proprietary Netbios OSI-compatible interface.

## Motorola 68040 latest salvo in chip battles

BY JULIE PITTA  
CW STAFF

AUSTIN, Texas — Motorola, Inc. last week fired the latest shot in the microprocessor wars with the debut of its 68040 chip.

Its rival, Intel Corp., is expected to introduce its 80486 microprocessor at Comdex/Spring '89, to be held April 10-13 in Chicago. Details on the 80486 remain undisclosed.

Users of workstations based on Motorola's 68000 family should be heartened by the faster version of the chip, which will run software applications used on previous Motorola-based systems without any alterations.

Hewlett-Packard Co. was the first vendor to say it will design workstations based on the 68040. HP also markets Intel-based personal computers and a line of workstations based on its proprietary reduced instruction set computing (RISC) microprocessor.

Apollo Computer, Inc. and Aris Systems Corp. are also ex-

pected to adopt the 68040.

Not all of Motorola's longtime customers may follow suit, however. Sun Microsystems, Inc. has yet to incorporate the new chip's predecessor — the 68030 — into its line of workstations. Industry analysts have said that Sun has been reluctant to adopt the 68030 and 68040 because both offer performance comparable to Sun's Scalable Processor Architecture, its version of RISC. Sun officials have said RISC will offer superior price/performance compared with traditional architectures and will eventually replace them.

### HP will augment desktops

Doug Johnson, HP's product marketing manager for workstations, said the company will continue to augment all three of its desktop computer lines.

"We have a large installed base of customers who have purchased Motorola workstations from us," Johnson explained, noting the installed base numbers 100,000. "We see many of

them adding a RISC node, but we don't see them pulling the plug on what they have already."

Johnson said he estimates that HP's 68040-based workstations will offer three to five times the performance of the 68030. Maximum performance will be achieved in floating-point applications, he said, adding that such applications make up the bulk of those used by HP's Motorola workstation customers.

According to Motorola, the new chip squeezes 1.2 million transistors onto a single chip. It combines integer, floating-point and memory management functions on a single chip as well as separate caches for data and instructions.

Additionally, it features a "snoopy," first used on Motorola's 88000 RISC processor. The snoopy is a hardware mechanism designed to relieve the burden on the operating system during multiprocessing.

Pricing and availability of the chip will be announced later this year. At that time, Motorola is expected to release more specific performance information.

Alice Leeper, senior industry analyst at Dataquest, Inc. in San Jose, Calif., said the 68030 and 80486 should be "comparable" in performance.

## Baseball system set for opening day

BY CLINTON WILDER  
CW STAFF

NEW YORK — Like all good baseball men, Dave Alworth spent the off-season winter months trying to improve his team and have it in perfect shape for Opening Day. That day has arrived at last, and Alworth's team is ready.

Alworth is Major League Baseball's director of baseball information systems, and his team is two IBM System/38s linked to personal computers at all 26 American and National League ballparks. For the second season, this network will provide teams and the media with updated baseball statistical reports every day from now through October.

While baseball owners were busy making trades and haggling over player salaries during the off-season, Alworth and his staff were busy fine-tuning software to capture even more of the national pastime's intricate nuances. They changed the way the application records double plays that end with a tag rather than a forceout, players who change defensive positions during a game and pinch hitters or relievers who join the game in

the middle of an at bat.

Alworth's team also got itself a new home — not a domed stadium, but a new 1,500 square-foot modern computer room at Major League Baseball headquarters in midtown Manhattan.

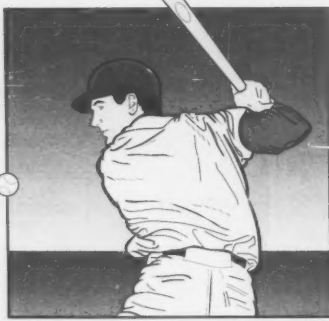
Called the Major League Baseball Information System, the IBM-sponsored application debuted last

year. The application also yields a detailed box score with fielding totals and pinch-hitting results — a daily sports page staple decades ago but now generally reserved for the All-Star Game and World Series. "We're going back to the way the game developed and using modern technology to capture that," Alworth said.

The software generates end results that are very similar to the traditional ones. The play-by-play text is like an old radio broadcast.

The application also yields a detailed box score with fielding totals and pinch-hitting results — a daily sports page staple decades ago but now generally reserved for the All-Star Game and World Series. "We're going back to the way the game developed and using modern technology to capture that," Alworth said.

Like the players and fans, Alworth has been counting the days until today's first pitch. The final versions of the software program were sent to each team last week, and Alworth was set to double-check the 26 team rosters this morning for any last-minute trades or minor-league demotions. When scheduled Cincinnati hurler Danny Jackson christens the 1989 season with his first pitch this afternoon, Alworth's computers will be ready.



FRANK C. O'CONNELL



Find Out Why ORACLE Is Ranked  
The Number One DBMS. Attend A Free Data  
Management Conference In Your Area.

CONFERENCE LOCATION \_\_\_\_\_ CONFERENCE DATE \_\_\_\_\_

NAME \_\_\_\_\_

TITLE \_\_\_\_\_ PHONE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

HOST COMPUTER(S) \_\_\_\_\_ OPERATING SYSTEM(S) \_\_\_\_\_

Your purchasing timeframe (check one):

☐ Up to 3 months ☐ 3 to 6 months ☐ 6 months to 1 year

- Learn about the fully relational DBMS that's compliant with ANSI, IBM SQL.
- Explore the productivity of 4GL & DSS tools.
- See portable applications run across micros, minis & mainframes
- Learn how CASE can end your application backlog.
- Integrate PCs & MACs with MIS.
- See the latest distributed financial applications.

**ORACLE®**  
COMPATIBILITY • PORTABILITY • CONNECTABILITY

**Call 1-800-345-DBMS, ext. 8134 today**

**TO RECEIVE PRIORITY RESERVATIONS AT THE NEXT  
FREE CONFERENCE.**

**ORACLE®**  
Conference Invitation



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS      PERMIT NO. 68      BELMONT, CA

POSTAGE WILL BE PAID BY ADDRESSEE:

CONFERENCE COORDINATOR  
ORACLE CORPORATION  
20 DAVIS DRIVE  
BELMONT CA 94002







# SAA. Oracle has it today.

In 1978, IBM drafted the specification for a new relational database technology called Structured Query Language, or SQL. Then, in 1979, two years before IBM delivered SQL/DS, Oracle Corporation delivered the first commercial implementation of SQL and has since become the largest database company in the world.

In 1988, IBM again produced a blueprint for the future of heterogeneous computing: Systems Application Architecture, or SAA. Oracle more than endorses this innovative vision. Oracle is delivering it. Today.

IBM's goals for SAA: "Applications that can be ported with less effort; applications that can span systems; user access to these applications that is simpler and more uniform; and programming skills that have broader applicability."

ORACLE is the only database software that runs on mainframes, minicomputers and PCs. In fact, ORACLE provides data transparency across your MVS, VM, VSE, and OS/2 environments in addition to over 80 other platforms and operating systems. Today.

**ORACLE 1989**  
*Always a step ahead.*

## More than just a software company

Oracle offers more than just software. We offer solutions. No other database company can offer a full suite of services including systems integration, education, consulting and the #1 customer support<sup>2</sup> in the industry. Which is why Oracle has become the largest database company in the world.<sup>3</sup>

Just as SQL was the future of data management in 1978, SAA is the future in 1988. Make an Oracle seminar part of your future, today. Call 1-800-345-DBMS to reserve your seat in the next Oracle seminar in your area: So you won't be somebody else's first customer, tomorrow.

# ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

**Call 1-800-345-DBMS, ext. 8139 today.**

Copyright © 1989 by Oracle Corporation. Oracle is a registered trademark of Oracle Corporation. IBM is a registered trademark of IBM. Other companies mentioned own numerous registered trademarks. TRBA

20 Davis Drive, Belmont, CA 94002 • World Headquarters (415) 599-8000 • ORACLE Canada (800) 387-4407 (except Quebec) • Quebec (514) 337-0755 • ORACLE Systems Australia 61-2-959-5080 • ORACLE Europe 44-1-948-8911 • ORACLE Systems Hong Kong 852-5-268846

### U.S. SEMINAR SCHEDULE

AZ	Scottsdale	Apr 11a	May 9	Jun 13a
	Tucson		Apr 18	Jun 20
CA	Costa Mesa	Apr 25f	May 18am	Jun 22f
	La Jolla		Apr 15a	Jun 15am
	Los Angeles	Apr 20a	Apr 25g	
		May 11cm	Jun 14amp	
Ontario			Jun 8cm	
	Redwood City		Apr 27g	
	Sacramento		May 16f	
	San Diego		May 16	
	San Francisco		Apr 25a	May 18f
	San Jose		Apr 12a	
	San Jose		May 2	
	Santa Clara		May 11c	
	Universal City		Apr 6c	
CO	Colorado Springs		May 11	
	Englewood	Apr 18a	Jun 6f	
CT	Farmington		Jun 15	
	Stamford		Jun 8f	
DC	Washington	Apr 13g	May 18g	Jun 15g
GA	Atlanta		Apr 26m	
	Savannah		Apr 27f	
IA	Des Moines		Apr 20a	
ID	Boise		Apr 13f	
IL	Chicago	Apr 18a	Jun 14c	
	Rockford		Apr 11	
	Springfield		Apr 20r	
IN	Indianapolis	Apr 25r	Jun 7p	
KS	Wichita		May 4r	
KY	Lexington		Jun 27	
	Louisville		Apr 4f	
LA	Baton Rouge		Apr 21c	
	New Orleans	May 5f	Jun 16c	
MA	Boston	Apr 20fm	Jun 6c	
	Burlington		Jun 13r	
MD	Baltimore		Apr 12c	
	Bethesda		Jun 20a	
ME	Augusta		Apr 18a	
MI	Dearborn		Apr 4f	
	Grand Rapids		Jun 6f	
	Troy		Jun 7a	
MN	Minneapolis	Apr 11mr	Jun 13a	
MO	Kansas City	May 9c	Jun 27f	
	St. Louis	Apr 13r	Jun 1g	Jun 6f
MS	Jackson		Apr 18a	
NC	Raleigh		Apr 19m	
NE	Omaha	Apr 6f	May 30g	
NJ	Iselin	May 11r	Jun 28f	
	Princeton	Apr 19a	May 17p	Jun 14c
	Secaucus		Apr 19f	Jun 1
NM	Albuquerque		Jun 7f	
NY	Albany		Apr 18a	
	Binghamton		Apr 4	
	Buffalo		Jun 6fm	
	East Syracuse		Jun 15f	
	Melville	Apr 11am	May 10r	Jun 13a
	New York City	Apr 5p	Apr 19f	
		May 3a	May 17c	Jun 14f
	Rochester	Apr 13p	Jun 7a	
	Smithtown		May 9g	
OH	Beachwood	Apr 5f	Jun 13c	
	Cincinnati		Jun 29m	
	Columbus		Jun 15c	
OK	Oklahoma City		Apr 19c	
	Tulsa		Jun 15r	
OR	Portland		Jun 13ap	
PA	Harrisburg		Apr 6	
	King of Prussia		May 26c	
	Philadelphia	Apr 10fm	Jun 19ap	
	Pittsburgh		Jun 14f	
	Scranton	Apr 19f	Jun 21c	
SC	Greenville		Apr 13f	
TN	Memphis		Apr 19f	
	Nashville		May 4f	
TX	Austin		May 11c	
	Dallas	Apr 4f	May 4ap	Jun 7fm
	Houston	Apr 6c	May 4f	Jun 8fm
	San Antonio		May 12c	
UT	Salt Lake City	Apr 26c	Jun 14p	
VA	Richmond		Apr 4f	
VT	Burlington		Apr 6	
WA	Seattle	May 17f	Jun 29g	
	Spokane		Apr 25f	
WI	Madison		May 18c	
	Milwaukee		Apr 26a	Jun 6f

### For Canadian Seminars

Call (800) 387-4407, except in Quebec, call (514) 337-0755.

The following key indicates additional afternoon seminars that are offered with these seminar dates:  
a Integrating Macintosh into Corporate Network  
c CASE Tools  
f Oracle Financials  
m Computer Integrated Manufacturing (CIM)  
p PC Workgroup Solutions  
r SQL Reportwriter  
t ORACLE Transaction Processing  
v Value Added Resellers (VARs)

Please note:  
# These seminars are directed to the federal Government only  
\* Only the indicated afternoon seminar is held on these dates

**Attn: National Seminar Coordinator**  
Oracle Corporation • 20 Davis Drive  
Belmont, California 94002  
**1-800-345-DBMS, ext. 8139**

☐ My business card or letterhead is attached. Please enroll me in the **FREE ORACLE** seminar to be held

at: \_\_\_\_\_  
on: \_\_\_\_\_

COMPUTERWORLD

# Humane Society collars a chip off the old hound dog

BY J. A. SAVAGE  
CW STAFF

NOVATO, Calif. — Dolly is a protodog — specifically, dog No. 7F7E482105. She's one of the first pets in Northern California to partake in an international database aimed at retrieving lost animals and preventing euthanasia.

Dolly sports the latest dog technology — a microchip tucked under her fur between her shoulder blades. Beginning the first week of May, Be Kind To Animals Week, the Marin County Humane Society will begin injecting microchips the size of a grain of rice into animals up for adoption. The pilot project is the largest so far in an effort to build a pet database.

"We may lose some money on it, but they may lose their lives," said Diane Allevato, the humane society's director. Allevato said she expects to "chip" nearly 2,000 animals the first year. After a few years she said she hopes to have enough animals in the database to see if the identification system actually helps reunite pets with their owners.

The usual \$40 injection and classification fee will be subsidized by both the humane society and the vendor, International Infopet System, Inc. in Agoura Hills, Calif. Any adopted pet will come with a microchip.

If, for instance, Dolly jumped her fence and was picked up as a stray, shelter personnel would wave a scanner over her back. The scanner would activate the chip and pick up a 10-digit number that appears on a battery-powered display. That number would be called into Infopet's hot line. From there, Infopet would check into dual databases residing on two IBM System/36s — one in Toronto and the other in Agoura Hills.

"Then, either we or the animal control



Allevato with protodog Dolly

officer would call the owner and let them know where the animal is," said Ed Burnell, Infopet's vice-president of information systems. Burnell said that the database can hold as much information as needed on the animal, including the breeder's name, whether it is vicious and details of any medical problems.

Burnell said that the implants have been available for a fee in clinics throughout Canada since last July. In the U.S., they have been used by some shelters and veterinarians on an optional basis since the last quarter of 1988.

Cats are expected to benefit most from being chipped. If a cat is missing, people assume they are out "catting about," Allevato said. Often, by the time an owner realizes the cat is actually missing, it may have been put to death. Allevato said that her shelter is currently able, without the microchip implants, to reunite 85% of the stray dogs but only 12% of the cats.

## Netview

CONTINUED FROM PAGE 1

of the problem is plain, simple cost."

An early user of MCI View, Covia would need to install a separate Netview/PC workstation — \$1,800 for the software plus the price of an IBM Personal Computer — for each of the many local-area networks it has implemented at Chicago's O'Hare Airport, as well as at travel agencies, he explained.

Several other large firms have rolled their own software to bring non-IBM networking devices under Netview management. American Express Co.'s Worldwide Telecommunications subsidiary recently implemented direct links between non-IBM terminal controllers and Netview. Its reasons for avoiding Netview/PC, as described by the director of the Netview interface project, Brian Brenner, are exactly the same as Covia's: the desire to minimize expense and failure points.

Sears Technology Services, Inc. is a third company to circumvent Netview/PC as an economy measure. The Sears Roebuck & Co. subsidiary has already developed a direct link between Netview and Series 1s controlling a wide variety of non-IBM devices. "The Series 1s were already generating alerts and alarms for attached equipment; it was a small developmental effort to format the information to go to Netview," said the subsidiary's senior vice-president, Gary Weis. Making that effort has saved Sears the cost of "hundreds, if not thousands" of Netview/PC workstations, he added.

While Netview/PC Release 1.2's \$3,150 price tag is considerably higher than that of Release 1.1, the new version allows users to address cost and point-of-failure issues by consolidating multiple Netview/PC and third-party network management applications on the same multitasking OS/2 Extended workstation, said IBM spokesman Gregory Smith. The problem is that porting existing third-party network management systems to OS/2 "would cost a lot of bucks," said Telwatch, Inc. spokesman John Brinegar.

Telwatch became one of the 10 early developers of Netview/PC 1.2 applications because supporting the interface "provides entry into true Blue shops," Brinegar said. The vendor is planning a summer release for Netwatch, a transmission line-monitoring device that will feed alerts to Netview via the new interface, Brinegar said.

But Telwatch is also working on a multivendor network management system, Netexec 2000, that "does not need an extra piece of hardware" between it and Netview, he added. If OS/2 had been available two or three years ago, Telwatch might have developed the product to share a workstation with Netview/PC, but now it is too late.

### Just couldn't wait

It may be too late for IBM to sell Netview as a telecommunications network management centerpiece — at least to large corporations that decided several years ago that they could not afford to wait for vendors to deliver multivendor network management.

One such firm is Electronic Data Systems Corp. (EDS). "We put a burr under IBM's saddle to develop Netview" as a multivendor system, "but we can't wait," EDS Vice-President Clay Johnson said. Last week, the GM subsidiary opened its Information Management Center, a huge facility for managing EDS' worldwide network and data processing centers.

Netview manages "everything SNA," while internally developed applications handle a wide variety of non-IBM networking equipment, said EDS' manager of network development Peter Abene. EDS found Netview/PC to be "very wanting in its ability to control elements," even limited to the Systems Network Architecture (SNA) realm, Abene said.

EDS still needed to link the SNA and physical networking sides in order to pinpoint trouble spots quickly, he said. Far from being the central manager, Netview feeds SNA network data to EDS' internally developed system, Abene said.

In the future, Netview will become just "one more element under our network management umbrella," Johnson said.

## Field Service Management Systems

Putting one on-line takes over 100 man-years and 3 million lines of code.

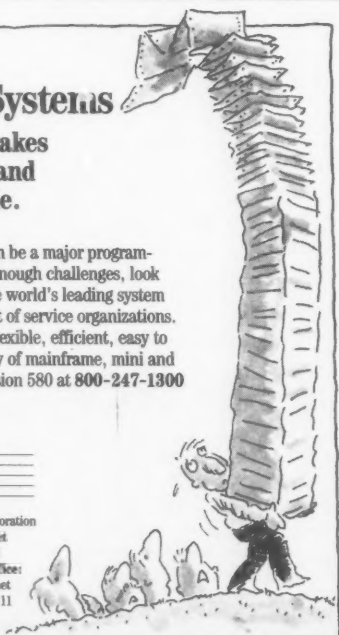
Automating customer service can be a major programming challenge. So if you have enough challenges, look into FIELDWATCH™ software—the world's leading system for the support and management of service organizations.

FIELDWATCH software. It's flexible, efficient, easy to implement, and runs in a variety of mainframe, mini and micro environments. Call extension 580 at 800-247-1300 (617-272-4100 in Mass.).

FIELDWATCH



The DATA Group Corporation  
77 South Bedford Street  
Burlington, MA 01803  
West Coast Sales Office:  
1750 Montgomery Street  
San Francisco, CA 94111



## Skirting Netview/PC

- **Digital Equipment Corp.** is evaluating how to link up to Netview via LU6.2 or Open Systems Interconnect's Common Management Information Protocol but definitely not via Netview/PC, a spokesman said.
- **MCI Communications Corp.** plans a future release of its MCI View product that will send alerts and alarms to Netview via Netview/PC but will additionally provide a direct LU6.2 link for Netview hosts to reconfigure and control MCI networks.
- **3Com Corp. and Communications Solutions, Inc.** announced two products last January that interface directly with Netview: Maxview, said to send alerts from a 3Com Network Control Server; and 3+Open Maxess 2.0, said to send alerts and receive commands.
- **Bytex Corp.** and IBM jointly developed Matrix Switch Host Facility 2, announced last September, which is said to allow Netview applications to send commands to Bytex's matrix switches. Through the switches, Netview hosts can reconfigure network devices (such as modem banks) at the port level in response to alerts and alarms delivered via the Netview/PC interface.
- **Data Switch Corp.** offers Totalnet, which is said to configure and collect alerts and alarms from a variety of systems and also act as a direct interface to Netview. An enhancement scheduled for the third quarter will allow users to generate Netview Command Lists to send commands down to non-Systems Network Architecture devices via Totalnet.
- **Netquest Corp.** announced earlier this year a line of modem controllers that are said to interface non-IBM modems directly to Link Problem Determination Aid, a Netview diagnostic application that IBM designed for its own modems.

# SATISFACTION GUARANTEED

If you have been searching for a software company that can provide you with a wide range of software solutions, backed up by first rate support, we invite you to join the over 6,500 MVS, DOS and VM users who have found long term software satisfaction with SEA. Since 1982, we have been developing products based on your input and backing these products with support you can count on 7 days-a-week, 24 hours-a-day. The results have been impressive for both us and our users. With products licensed at one in every four mainframe sites worldwide, SEA software has set new standards for efficiency and performance. Our over 6,500 licensed users include 9 of the Fortune 10, 85% of the Fortune 500 and thousands of other installations of all sizes and configurations. An equally important factor in measuring our success is our high level of user satisfaction, in which we take great pride.

## SEA PRODUCT GROUPS

### **Operations Automation Group**

SEA provides a complete line of operations automation products covering all critical areas. We are the only company that provides such a complete line of operations automation software, backed up by first rate technical support. With over 2,500 users choosing SEA as their single source for operations automation software, we have assumed a position of leadership in the field. Many users tell us the reason they have selected our products is superior support, as well as our integrated approach to long term product development.

**ODDS** - Master Console Management.

**\$AVRS** - Sysout, Syslog and JCL Management, Viewing, Archival and Retrieval.

**TRMS** - Report Management and Distribution.

**CSAR** - Automated Job Scheduling MVS-DOS-VM.

**TRAMS** - Data Transmission Management System.

**QUICK** - Data Compression/Decompression for increased data transmission between mainframes or mainframes and PC networks.

**SYNTHETIC** - Functionally verifies operating system and **JOBSTREAM** hardware changes before production implementation.

**KEYS** - A keyword assisted search program for software and hardware inventory management.

### **Application Development Group**

SEA's application development products, used at over one thousand locations, have helped increase programmer and program productivity. They aid in application development for CICS, database systems and monitor program performance and operational dependencies.

**PRO-2** - Application Development MVS-DOS.

**PROFILE** - Performance Measurement and Analysis.

### **DASD/Data Management Group**

SEA's DASD/Data management tools have become corporate standards, used in one out of every five MVS data centers worldwide. Our DASD management products provide dramatic savings under virtually any configuration and have set a new standard for efficiency and high performance.

***We take very seriously our claim of being able to significantly decrease DASD expenditures in any MVS configuration. Our unique approach enables us to guarantee you significant savings in both short and long-term DASD cost. Take the opportunity to trial our products with no obligation and we will provide you with the same guaranteed results achieved by over 4500 users, regardless of your installation's size or configuration.***

**PDSFAST** - High speed DASD Management, PDS Management, 100% IEBCOPY replacement.

**FASTGENR** - High speed replacement for IEBGENER.

**PDSUPDTE** - High speed global JCL/PDS editor.

### **VSAM Group**

On the average, VSAM consumes over one-third of all DASD and greatly impacts performance at many installations. SEA's VSAM products have helped many users reduce VSAM space requirements by over 25% while greatly increasing VSAM performance.

**VCF/L** - ListC replacement, VSAM tracking and reporting.

**VCF/M** - Automated VSAM optimization and allocation.

**VCF/D** - VSAM data manipulation.

***SEA also offers a complete line of products for the DEC/VAX environment including DBMS/4th GL and output queue optimization.***

SEA has products that will save budget dollars and increase efficiency, whatever your installation's size or configuration. No other software company even comes close to matching our combination of a comprehensive line of high quality software solutions, backed up by the highest levels of technical support. We invite you to join the thousands of installations who have found long term software satisfaction with SEA products.

***For further information regarding any of the above call 1-800-272-7322.***

**SEA** **SOFTWARE ENGINEERING OF AMERICA, INC.**  
WORLD HEADQUARTERS • 2001 Marcus Avenue, Lake Success, New York 11042  
Tel: (516) 328-7000 1-800-272-7322 Telex: 6973556 Fax: (516) 354-4015

*Products Licensed In Over 40 Countries*



# PS/2 split hits two-year mark

## ANALYSIS

BY DOUGLAS BARNEY  
CHIEF STAFF

BOCA RATON, Fla. — Two years and one day ago, IBM announced the Personal System/2 line of personal computers and its Micro Channel Architecture (MCA) bus, ushering in one of the most virulent debates in computer history.

At the time, the industry as a whole viewed the line as a stab at bringing back proprietary PC systems, with virtually no advantage over existing open systems. Like a good wrestling match, the debate

was couched in terms of good vs. evil.

In fact, many large shops have embraced the PS/2, but the argument still rages on as most smaller shops buck the PS/2 trend.

Cloners clearly had IBM on the ropes during the early rounds in the match of words and market share. Because old boards would not work and old floppies failed to fit, the PS/2 stalled. IBM was further castigated for yanking its popular IBM Personal Computer XT and PC AT off the market despite continuing demand.

IBM, however, had battered down the hatches for a long, bloody siege. After two

years of enhancing the line and garnering the support of board makers, the PS/2 is finally a force to be reckoned with. It has also created a fundamental split in the industry.

Many users are still utterly unconvinced of the MCA's benefits. "We haven't purchased or even had a demo in our shop. I haven't seen anything to outdistance it from some of the high-end PCs on the market," said Tom Kovacs, MIS manager at Wickes Furniture, a division of Wickes Companies, Inc.

Even though IBM has paid a visit to Santa Fe Braun, Inc. to pitch the PS/2, Joe Croupe still does not possess a single machine. "We haven't even looked into it," said Croupe, operations manager at



IBM's PS/2 has spurred heated debate

the California-based oil company.

IBM moved at a snail's pace to describe the benefits of the MCA, which early on was touted with such vague platitudes as providing a more "balanced" system. The firm was even slower in demonstrating the benefits with next-generation add-on boards, which are only now starting to trickle in.

Lost in the banter and battles is the fact that the Micro Channel is a fundamentally more capable bus architecture than the older AT-style bus. That message has only recently been promoted, since a coalition of IBM competitors announced its own 32-bit architecture that implemented many features similar to those of MCA.

IBM is now locked in a vicious battle with the Extended Industry Standard Architecture (EISA) group of vendors that has thumbed its collective nose at IBM. EISA member Compaq Computer Corp. continues to argue that buses such as the MCA — and even EISA — offer no advantages to single-user machines. Instead, Compaq will position its EISA machines as departmental servers. This is a fight that will not be waged until later this year, when EISA machines are scheduled to ship.

## FRESH AS MORNING COFFEE AND BAGELS...



### HOT REPORTS!

Most people are so concerned with just getting their reports they never consider how COLD they may be when they finally arrive. There is a way you can get them while they're HOT; while they're useful.

Let the reports wait for you.

The Report Management System®/ONLINE (RMS/ONLINE) is one of three award-winning report management products that gives you immediate availability and fingertip control of your reports. Using these systems, any report distributed can be waiting at your desk when you start the day. If you need multiple versions of a report, it's no problem. Each report can be viewed, reprinted, or compared with any other version or any other report.

As close to paper as you can get.

When you use a terminal to replace a paper report, the system has to be easy to use. RMS/ONLINE features, like windowing and bookmarking, give you the sense that you're holding the report. If you don't like the way your report is arranged, you can reformat it to suit your terminal or your taste. For sensitive reports, viewing can be limited to specific column ranges for each user/report.

From a company that actually knows Report Management.

Mantissa's RMS/BASIC, RMS/ONLINE, and RMS/SPOOL let you take control of report distribution, online viewing, and VTAM printing one step at a time until control is complete. Significantly, the talent that was there during the first installation

(and the 700th) is still there today. We have years more experience in report management than any other company.

If you would like to know more, call for a free copy of our Report Management System Evaluation Guide.

Toll free 1-800-438-7367.



**Mantissa**

Mantissa Corporation  
244 Goodwin Crest Dr.  
Suite 200  
Birmingham, AL 35209  
205/945-8930

European Inquiries:  
Namic A.S.  
Engelbrekts vei 3  
N-0275  
Oslo 2, Norway  
Phone: 47(2)522150

We started the whole business of report management

## EDS christens info center

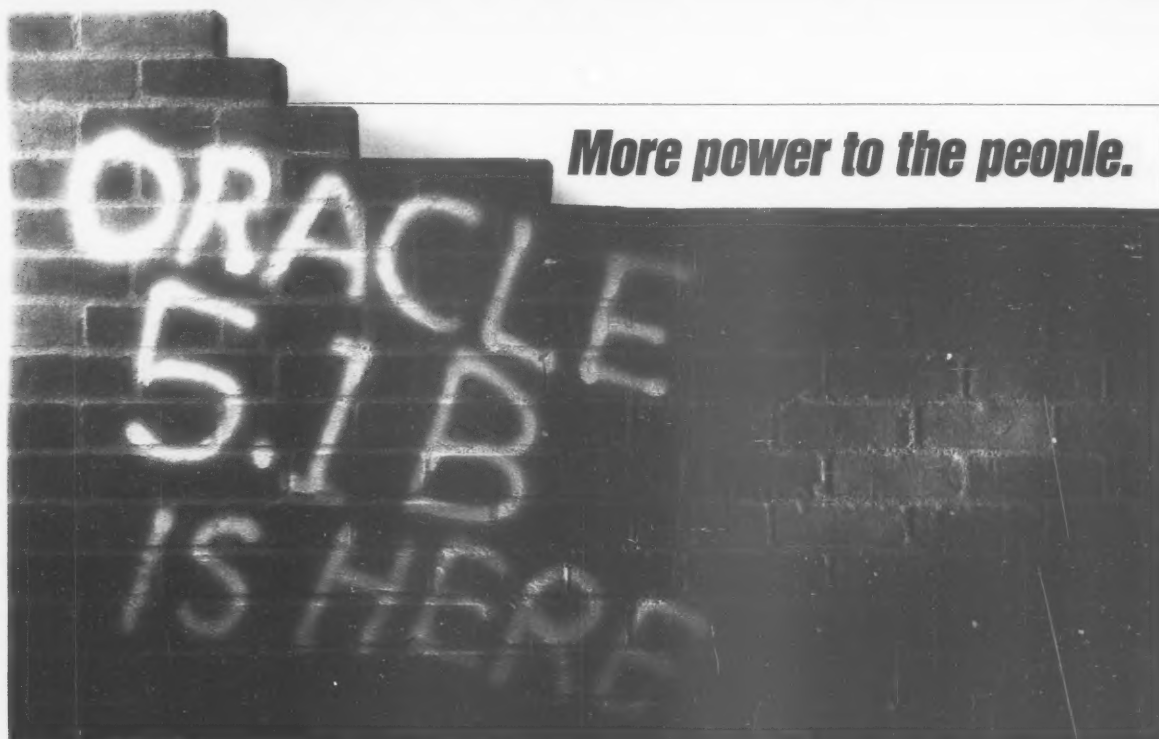
PLANO, Texas — Seeking to bolster its credibility as a complete systems integrator, Electronic Data Systems Corp. (EDS) last week officially opened its Information Management Center, a gigantic facility meant to ensure reliable delivery of networking and data processing services to 6,000 customers.

By consolidating engineering, operations, maintenance and planning personnel and systems into one facility, EDS will be better able to leverage these resources and management personnel and will pass the resulting cost savings on to its customers, according to John Muscarella, manager of EDS' information processing services division.

The center "fits in with EDS' strategy of progressively turning into a broad-based, soup-to-nuts supplier of information processing, networking facilities management and systems integration," said Brian Jeffery, managing director for Los Altos, Calif.-based research firm International Technology Group.

The culmination of a four-year, \$1 billion development effort, the center is responsible for 24-hour reliable operation of EDS' 21 information processing centers and its worldwide network, EDSnet.

ELISABETH HORWITT



ORACLE has led a revolution in PC relational database technology. More power. More portability. More connectivity. More reasons than ever to make ORACLE your corporate standard database.



### New tools with even more power.

We're proud to announce our newest release—Professional ORACLE Version 5.1B. Now you can run your applications in OS/2 or in protected mode above 640K in MS-DOS. So you have more room for more powerful applications. And those same applications run unmodified on almost all workstations, minicomputers and mainframes.

Version 5.1B delivers a new level of power to your PC developers including the latest versions of:

- **SQL\*Forms®** NEW! Enhanced 4th-generation application development environment.
- **SQL\*Menu®** NEW! Flexible interface builder for defining complex menu systems.

• **SQL\*ReportWriter™** NEW! Non-procedural development and runtime powerhouse for producing any report.

• **SQL\*Plus®** Oracle's ANSI-standard SQL query and administration tool.

• **Pro\*C™** The C-language pre-compiler and subroutine call interface to ORACLE.

### Learn SQL on us.

Learn the language of the revolution. Order Professional ORACLE today for \$1299 and we'll include ORACLE SQL\*Tutor, a nine-module PC-based SQL instruction program that sells by itself for \$199.

### Try ORACLE for \$199.

Our Trial Version is identical to Professional ORACLE, but can't be used in networked configurations and allows a maximum user database size of 1 MB. It's a powerful tool for prototyping your first ORACLE application. And its price can be applied to the purchase of a full Professional ORACLE license.

**ORACLE®**  
COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-ORACLE1, ext. 8131 today.

### Money-back guarantee.

If you haven't tried ORACLE yet, now there's even more reason to join the SQL revolution. More tools. More power. If ORACLE 5.1B doesn't revolutionize the way you develop PC database applications, return it within 30 days for a full refund.

Call 1-800-ORACLE1 ext. 8131, or an ORACLE MasterVAR today.

### Dear Oracle

Oracle Direct • 20 Davis Dr. • Belmont, CA 94002  
1-800-ORACLE1, ext. 8131

Since your 30-day money-back guarantee eliminates any risk on my part, please send me the software below. Enclosed is my ☐ check, or ☐ VISA ☐ MasterCard ☐ AmEx credit card authorization. Offer valid only in the USA. Please send ☐ 5.25" High Density or ☐ 3.5" disks.

- ☐ Professional ORACLE for MS-DOS with free ORACLE SQL\*Tutor for \$1299..... \$ \_\_\_\_\_
- ☐ Professional ORACLE for MS-DOS Trial Version for \$199..... \$ \_\_\_\_\_
- ☐ Professional ORACLE for OS/2 for \$1299..... \$ \_\_\_\_\_
- Professional ORACLE Requirements: IBM-PC/XT — 80286/80386 PC with MS-DOS 3.1+, hard disk, 640KB of memory and 800K extended memory required. 2.5MB of extended memory recommended (required for SQL\*ReportWriter). OS/2 — 80286/80386 PC w/ OS/2 V1.0, hard disk, 3MB memory. SQL\*ReportWriter not available for OS/2 and is replaced by SQL\*Report.
- ☐ Just send ORACLE SQL\*Tutor for \$199..... \$ \_\_\_\_\_
- Minimum Requirements: 256K PC with hard disk. Color monitor suggested.

Subtotal..... \$ \_\_\_\_\_

Please add appropriate sales tax..... \$ \_\_\_\_\_

Total enclosed/authorized (USA only)..... \$ \_\_\_\_\_

NAME..... TITLE.....

COMPANY.....

STREET (no P.O. boxes, please).....

CITY..... STATE..... ZIP.....

PHONE.....

CREDIT CARD NO..... CARD EXPIRATION DATE.....

SIGNATURE..... TODAY'S DATE..... COMPWORLD



# IBM signs onto CD-ROM team

BY PATRICK WAURZYNIAK  
CW STAFF

ANAHEIM, Calif. — Compact disk/read-only memory (CD-ROM) applications developers may still be grappling with practical corporate implementations

of the technology, but that did not deter IBM from joining Microsoft Corp. last week in a plan to develop a standard for multimedia personal computers.

At Microsoft's Fourth International Conference on CD-ROM here, IBM joined hands

with both Microsoft and Intel Corp. to further the development of multimedia standards.

IBM and Microsoft are attempting to make CD-ROM/XA (Extended Architecture), which supports interleaved audio, an open industry standard for multi-

media PC computing systems by incorporating it in Microsoft's Windows/386 and IBM's OS/2 Presentation Manager.

CD-ROM/XA is an enhancement to the original CD-ROM specification developed by Microsoft, Philips Telecommunications N. V. and Sony Corp.

In addition, IBM announced it had signed an agreement with Intel to develop Micro Channel

Architecture board-level products to bring the multimedia format known as Digital Video Interactive (DVI), a technology Intel acquired last year from General Electric Co., to IBM's Personal System/2 line of personal computers.

## Next generation

James A. Cannavino, IBM vice-president and president of IBM's Entry Systems Division, told more than 2,000 conference attendees that IBM considers multimedia technology, including Intel's DVI, as the next-generation way to integrate audio and video data with enhanced graphics on PCs.

"We're poised at the beginning of an era that will change the way people use personal computers," Cannavino said. "IBM's goal is to make tangible solutions for our customers, and multimedia offers so much potential for personal computers."

Meanwhile, a handful of firms continue making practical CD-ROM implementations such as Hewlett-Packard Co.'s Laserrom compact disk-based documentation service and Digital Equipment Corp.'s recent decision to put its VMS operating system manuals and documentation on compact disks.

## In the field

Chicago-based accounting firm Arthur Andersen & Co. in Chicago recently completed distribution of 1,200 portable CD-ROM readers to its field auditors, who will use CD-ROM reference disks full of technical information on Securities and Exchange Commission regulations and the company's own proprietary procedures, guidelines and software applications.

Other companies with CD-ROM programs, such as Lotus Development Corp. in Cambridge, Mass., are investigating the practical uses of multimedia compact disk technology.

Lotus, which for two years has marketed its One Source family of CD-ROM financial and database products, last week demonstrated an internal multimedia application prototype that will be used to tout the firm's June introduction of 1-2-3 Release 3.0.

# Deja View.



Productivity has never been so familiar.

It only seemed natural for us to create our XPERT Series of programmer productivity tools with an ISPF-like design. You'll learn skills faster and produce results immediately—something you can never see enough of.

DATA-XPERT, IMS-XPERT and DB2-XPERT all work the way programmers do. They're compatible with all the commonly used programming languages, file organizations and data base management systems in the IBM MVS environments.

Access to files and data bases like you've never seen.

Without getting tied up by using time-consuming utilities, you can easily access VSAM, ISAM, BDAM, PDS, Sequential files, and IMS and DB2 data bases. Once you're there, you can selectively edit, browse, extract, load, convert, reformat, and print any size file or record to get just the data you need.

See for your elf.

Find out why the XPERT Series is rated #1 over the competition.\* Call today for more information or a free 30-day trial of DATA-XPERT, IMS-XPERT or DB2-XPERT.

Call 1-800-344-9223;  
in Canada, 1-800-344-9224.

The XPERT Series. Things will never seem the same again.



XA SYSTEMS CORPORATION

The Essential  
Software  
Company



\*Harris Survey, January 1989. DATA-XPERT and IMS-XPERT are registered trademarks of XA Systems Corporation. DB2-XPERT and The Essential Software Company are trademarks of XA Systems Corporation. ESP, IMS and DB2 are products of IBM.

Want to sound off, ask a question or just chat with other IS professionals? The *Computerworld* bulletin board has been enhanced with an open forum for general discussion and E-mail to our staff and other registered bulletin board users. Call and fill out our on-line survey so we can add more features that interest you. Our modem number is 508-626-0165.



COMPUTERWORLD

## EDITORIAL

## Cut it out

**A** SOFTWARE INDUSTRY association musters righteous indignation over a loophole that allows state agencies to copy software without liability. Both Microsoft and Apple issue press releases announcing that they each won the first round of Apple's copyright-infringement suit. Ashton-Tate rattles its legal sabers at anyone who even considers cloning the Dbase language. Members of rival Unix camps snipe at each other, while AT&T's Robert Kavner has reportedly taken steps to personally prevent the groups from linking up.

Fade to black.

Same time, different scene: Motorola announces the 68040 processor. Intel prepares to unveil its next-generation 80486 just six weeks after introducing a RISC chip that crams a million circuits onto a sliver of silicon. Data General develops a 17-MIPS workstation for less than \$8,000, eclipsing DEC's new price/performance standard after just six weeks.

Isn't something terribly wrong here?

Software development has lagged behind hardware engineering for a long time, but the gap is widening and the software industry looks less equipped than ever to do anything about it. The business is rife with delays, broken promises and litigation. Industry leaders who griped for two years that they desperately needed a follow-on to PC-DOS sit like bumps on a log as OS/2 passes its first birthday.

Instead, the software industry is captivated by the same things that occupied it three years ago: protecting copyrights, extending intellectual property laws, preventing users from copying software and squeezing a few extra bucks out of an upgrade. Periodically, industry leaders meet at conferences to clap each other on the back for knowing so well what their customers want.

This is not to trivialize the importance of intellectual property or licensing issues. But the contrast between the technology leaps made by hardware makers and the plodding progress of the software industry is too great to ignore. With the introduction of the 80486, Intel's PC hardware will be two full generations ahead of the most advanced operating system available for it. Unix remains mired in committee meetings and politicking, while RISC processors are making MIPS a disposable commodity. Software vendors desperate to keep their name before the public are resorting to "strategic alliances" and "joint development agreements" that promise vague products far down the road.

Meanwhile, buyers say they want new software, but what they really need is products that meet the specific needs of their business. There is a real market for manufacturing software incorporating real-time data collection, mainframe access and interactive graphics, but there's not much interest in another spreadsheet.

The hardware is there to make that kind of application a reality. Will the software industry stop fighting long enough to see it?



## LETTERS TO THE EDITOR

## Worm returns

Computer newspapers during the past few months have been publishing letters about two seemingly unrelated events. One concerns the Internet attack. The other is the perceived notion by some readers that acronyms are not defined often enough in articles.

An early morning revelation has shown me that there is, however, a connection. I offer the following two acronyms as proof that the two events are related.

Wipe  
Out  
Remaining  
Memory  
Systems

Valiantly  
Infesting  
Resources  
Under  
Seemingly  
Excellent  
Security

Lee Schultz  
Assistant Director  
Academic Computer Services  
The College of Wooster  
Wooster, Ohio

## Not-so-new auditors

As an auditor for the past 15 years, the majority of them in data processing, I take exception with Les Gilliam's column, "The new EDP auditors" [CW, March 13]. I agree he brings up valid concerns, but these are issues that have been around for years and are of concern to management consultants, external auditors, internal auditors and so on.

He is surprised that IS departments continue to operate

by the seat of their pants without standards. That would not surprise most EDP auditors, old or new. That is a department manager's prerogative, and successful departments are managed in many different ways — with or without management systems.

I don't think there are new EDP auditors, but there are new challenges to EDP auditors, including PC controls, local-area network/distributed processing and telecommunications issues. Communicating these technical control concerns to senior management is the new demand on all EDP auditors today. Next time, why not ask an auditor?

John F. Browne  
Life Audit Manager  
Chubb Insurance Co.  
Concord, N.H.

## No light snack

Regarding "No backup available if sharks get hungry" [CW, March 13], I work as a PC software and communications consultant, but I also have a fair background in marine biology. I recollect that sharks have a keen electromagnetic (E&M) sense, and as such they are extremely attracted to anything that emits E&M waves, such as underwater copper communications cables.

However, fiber-optic cables do not emit E&M waves, because they are laser light waveguides. The only places that could emit E&M waves are the repeaters and splicers; properly shielded, these would not emit them either and therefore would not attract sharks.

In other words, I see fiber-optic cables as much more resistant, if not totally immune, to sharks than their copper coun-

terparts. The problem is that this information is not well-known in the business world. Most people think that glass fiber cables are just as attractive to curious and hungry sharks as copper cables are.

Daniel Lyons  
PC Software Consultant  
Boulder, Colo.

## Bachman update

We would like to point out some information that was incorrect in your recent coverage of our new product [CW, March 13].

• The Bachman/DBA for IBM's DB2 is not an enhanced version of the Bachman/Data Analyst. It is a separate product. Release 2.1 includes an enhanced version of the Bachman/Data Analyst product, released in June 1988.

• Version 1.0 of the Bachman/Re-Engineering Product Set supported the building of IDMS database designs from scratch or through reengineering existing IDMS systems. It did not support these tasks for DB2. This capability was introduced in Version 2.1.

• Current products translate existing database designs into database-independent designs that can then be forward-engineered into IDMS as well as DB2 designs.

Arnold Kraft  
President  
Bachman Information Systems  
Cambridge, Mass.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.



# Users prefer promises, not simply products

EFREM G. MALLACH



Products are what most vendors care about. But it's the promise of the products that users care about.

Products are necessary, but not sufficient, for a promise to be realized.

Just as vendors need to recognize that they are purveyors of promise as well as product, so too must we in information systems. We are suppliers to the users in our organization. They are our customers, and they expect more than just raw product.

What's the difference between delivering a product and delivering its promise? We see it in any significant purchase we make in our personal lives — a Caribbean vacation, for example. The product I buy is carefully and legally defined by the tour operator: plane tickets, hotel room, meals.

The promise is quite different: warm weather, sandy beaches, reggae bands, no worries. If I get the product but not the promise, I'll be miffed. I may have no immediate recourse. Tour operators hire expensive lawyers to write ironclad contracts.

The problem may not be the tour operator's fault, but I'll still be miffed. I may never use that operator or visit that island again. And I'll tell all my friends not to.

## The IS assumption

In an information systems shop, when we develop a prospective system for our sales department, we might think we contract to deliver working software. The program is defined by a specification or a prototype.

When we meet the terms of this contract, we've done our job. If we're really user-focused, we might extend our contract to include a user manual, training sessions and help lines. But they are still products, and users don't really want products.

What do they want? In this case, it's information about sales prospects. We may choose to deliver this data via a computer, but that's incidental. If users could get this information more quickly and easily by examining the entrails of a sacrificial goat, they would want goats. And it would be our job to deliver goats.

This recognition implies a new mind-set on the developers' part. It means sitting down with

users to see how they really do their jobs, not just relying on a signed-off spec. It means thinking of software quality not in terms of bug frequency but in terms of meeting users' needs on the job.

It means checking with our users on an ongoing basis to see if the system is being used as intended and is performing to their satisfaction. It means not resting until they are satisfied. If we don't do all these things, we can't deliver the promise of the systems we develop.

Delivering the promise of a new system may mean going beyond technical issues. Effective use of a new system may require behavioral and cultural changes within the user organization. Developers who see their jobs as

**DEVELOPERS WHO want to deliver the promise must address the whole picture, including the behavioral issues.**

writing code to meet a spec will ignore this requirement or shrug it off as someone else's problem.

Developers who want to deliver the promise must address the whole picture, including the behavioral issues. Perhaps it is not in their power to mandate the necessary changes. But it is within their power to discuss these needs thoughtfully with those who can bring them about and to develop a usable system for real people rather than a technological marvel that cannot succeed in any achievable organizational climate.

The difference between the two approaches is not expensive. The product — a working system — must be designed and delivered in any case. So must its training, documentation and support.

The need to make changes and the cost of making them cannot be avoided by waiting until the users insist on them; they can only be postponed. These items are the major expenses. The cost of communicating with users, of really listening to them, is negligible by comparison.

So the change is not in the budget but in the focus. Everyone from the most junior programmer to the head of MIS must see his or her job as meeting users' information needs — not writing a transaction validation module; not designing a database schema; not managing a

*Continued on page 18*

# Nebulous system in the making

MICHAEL B. COHN



Something is up when the director of MIS wants to see a systems analyst at 4:30 p.m. on Friday. Either

it's very good news or very bad news, and because my car had been sitting in Visitor Parking since lunch, I figured it was the latter.

The door was open, and she motioned me to sit down. "Weren't you a maintenance programmer on the billing system?" she asked, as she pulled a file folder from her desk.

"Yes, ma'am," I replied, "but that was several years ago." I knew it — one of their history tapes must have been on fire. Or someone dropped a disk pack. I grabbed the arms of the chair.

"Well, I promised the billing manager a while ago that we'd look into installing a new system," she said, paging through her desk calendar. "He'll be back from vacation on Monday, and we haven't done a thing. Could you do some research and get back to me?"

"What type of system are we talking about?" I inquired casually, relieved that my car had gone undetected.

"I have no idea," she replied, as her phone rang. "Just talk to a few of his people first thing next week. OK?"

I was a bit confused. But in case that phone call was about billing reports printing upside-down, I decided to make a hasty retreat out of her office and into the weekend.

## To the source

First thing Monday, I lined up the manager and a few of his users on my calendar. I brushed up on my old billing notes, and on Tuesday, I started with Barbara, who had been a clerk there longer than anyone could remember, probably well into the 18th century.

Barbara's desk was smothered with piles of binders, folders and printouts. After I had waited for several minutes, she emerged from under one of the stacks. "I used to have an extra chair around here someplace," she said, but she obviously didn't anymore. I sat down on a column of what looked like reports from last year leaning next to her desk. "Pardon the mess," she apologized, "and I hope that's not the pile where I left that tuna sandwich." And I hoped it wasn't near the top.

"So Barbara," I asked, "what do you hear about this new billing system?"

Cohn is a quality assurance representative based in Atlanta.

She made a face as if I'd just asked her to take off her clothes. "What new system? Who said anything about a new system?"

Perhaps going to Barbara first wasn't such a hot idea. I took a softer approach. "Uh, they're probably just talking about some new system enhancements," I suggested. "Maybe you could just give me some idea what you do with the reports you're getting now?"

"I'm supposed to get all the error reports," she responded, with a heavy emphasis on the "supposed." "I'm supposed to put the dailies in the blue binders, the weeklies in the red binders and the monthlies in the green binders, but we're out of

were you thinking about for the data entry screens?"

"Oh, don't change those. We want them to work just the way they work now," she replied. "We've invested a lot of training on data entry."

"No problem," I assured her, since I had designed most of those panels myself. "What type of features were you thinking about for on-line queries and reporting?"

"Oh, you need to make sure that we have all the same reports and features that we get from the current system," she said without hesitation. "We have to keep all of that stuff."

I scratched my head. "Well, I'm not sure I follow you. You



BEATTA SZPURA

them, so I'm using extra blue binders."

She unlocked the large drawer at the bottom of her desk and a flock of colored binders spewed forth.

"Who reads these reports?" I asked as she tried to close the drawer.

"Beats me," she said as she strained against the stubborn binders. "I keep this drawer locked most of the time, anyway."

"Well, why do you even get these reports, Barbara?" I innocently asked as she rammed one knee into the still-open drawer and ran her nylons in the process.

She was irritated. "Would you tell me how they'd get into the binders, then?"

It looked like she was backing up to get a running start at me. So I hastily thanked her and made a quick exit, heading for the billing supervisor's office.

This woman was expecting me and knew about the new system.

"We've been talking about it for some time," she said. "We think that you should use one of those databases like some of the other companies are using."

"Well, first things first," I said, opening my notebook again. "What kind of changes

want a new system with all the same inputs and outputs of the old system?"

She nodded.

"In that case," I wondered aloud, "why a new system? Were you looking for some type of connectivity? Or download/upload from PCs? Or modeling and analysis tools?"

"All that would be nice," she said, "and maybe one of those databases like the other companies are using."

On Friday, I was finally able to get in to see the billing manager. He still sported a nice vacation tan. He was eager to talk to me.

"I understand you've been talking about the new system with some of my people; that's just great," he said. "What kind of questions do you have?"

"Well, sir, I've heard a couple of different stories about the new system," I replied, as I opened up my notebook. "Could you give me some idea of the major features you're looking for?"

"I'm not quite sure what we want yet," he paused, leaning back in his chair. "Why don't you go back to your office and write up a schedule and do some Gantt charts. Maybe you could come up with the major dates, like for coding and testing, and an implementation date. Once I see that,

*Continued on page 18*

Mallach is a faculty member at the University of Lowell in Massachusetts and a consultant to users and vendors.

## BOOKS IN BRIEF

**Ideas and Information: Managing in a High-Tech World**  
By Arno Penzias

The Nobel laureate (Physics, 1978) from Bell Laboratories traces the evolution of computer technology, demystifying it along the way for those who fear its impact and showing how the mind and the machine can work

together productively.

Hardcover, 224 pages, \$17.95, ISBN 0-393-02649-3, by W.W. Norton & Co., New York.

**The Pick Perspective**  
By Ian Jeffrey Sandler

A book that explores not only what Pick does and how — something novices to the operating system need to know — but also why the operating system

acts the way it does, which is insight of interest even to old hands at Pick.

Hardcover, 290 pages, \$34.95, ISBN 0-8306-3123-2, by Tab Books, Inc., Blue Ridge Summit, Pa.

**Measuring Business Value of Information Technologies**

By Paul Strassmann, Paul Berger, Burton Swanson,

Charles Kriebel and Robert Kauffman

Leading management strategists provide innovative approaches to answering a difficult question: What is the strategic value of information technology?

Hardcover, 173 pages, \$34.50, ISBN 0-945098-02-2, by ICIT Press, International Center for Information Technologies, Washington, D.C.

**On-Line Text Management**

By P.C. McGrew and W.D. McDaniel

An examination of Hypertext and other techniques for creating, managing and using an on-line, mainframe-based text environment.

Hardcover, 242 pages, \$39.95, ISBN 0-07-046263-1, by McGraw-Hill Publishing Co., New York.

## The Right Answer: 3270 Emulation at Half the Price.

### MultiCom3270™ Terminal Emulation System for IBM® and compatible Personal Computers

Are you put off by the high cost of 3270 terminal emulators? If so, then Multi-Tech's new MultiCom3270 IRMA®-compatible Terminal Emulation System is the Right Answer for you.

MultiCom3270 consists of a coaxial 3278/79 terminal emulation card and our MultiCom3270 plus file transfer software, in versions for both PC/XT/AT computers and the IBM Micro Channel Personal System/2. It lets your PC communicate through a cluster controller directly with your IBM mainframe computer.

So why go with our MultiCom3270 instead of "Brand I"? The Right Answer is price. At \$699 suggested retail (including both hardware and software), the MultiCom3270 is about half the cost of an IRMA board and software. That's a cost savings that can really add up!

IRMA is a registered trademark of DCA (Digital Communications Associates, Inc.)  
IBM, Micro Channel Personal System/2 are registered trademarks of International Business Machines Corporation.

But price isn't the only thing. MultiCom3270 is both IRMA compatible and easy to use. Session operations are handled by simple keystrokes, with pulldown windows and on-line help information. You also get keyboard record-playback and keyboard lock, which enhance the speed and security of your system.

For a 3270 terminal emulator that delivers the best combination of features and reliability at half the cost, MultiCom3270 is clearly the Right Answer.

Call us toll-free at 1-800-328-9717 for more Right Answers.

See us at  
**COMDEX/Spring '89**  
April 10-13, 1989  
McCormick Place  
Chicago, Illinois

**MultiTech**  
Systems

The right answer every time.  
Multi-Tech Systems, Inc.  
2205 Woodale Drive  
Mounds View, Minnesota 55112 U.S.A.  
(612) 785-3500 FAX (612) 785-9874  
International Telex 4998372 MLTTC

Publishers wishing to have their books considered for review or excerpting can direct books, pre-publication galleys, press releases, catalogs or other information to George Harrar, Features Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

## Cohn

FROM PAGE 17

I'll be able to better tell you what kind of system I want. How's that sound?" He placed a hand on my shoulder and walked me to the door.

I headed back to my cubicle with a very empty feeling. In transit, I passed the open door of the MIS director. She was on the phone but spotted me and waved me in. I wasn't making a lot of progress, but at least I was getting some great visibility. I opened up my notebook and waited until she hung up.

I was assertive. "Let me tell you where I stand on the new billing system," I offered.

"Maybe some other time," she said, as she looked out the window. "Right now, I want you to go move your car out of Visitor Parking."

## Mallach

FROM PAGE 17

project. The job is to meet users' information needs. All else is a means to that end.

The danger of a product focus to a vendor is obvious — Chapter 11, in which the company can join dozens of other firms that thought technically excellent products were the whole story.

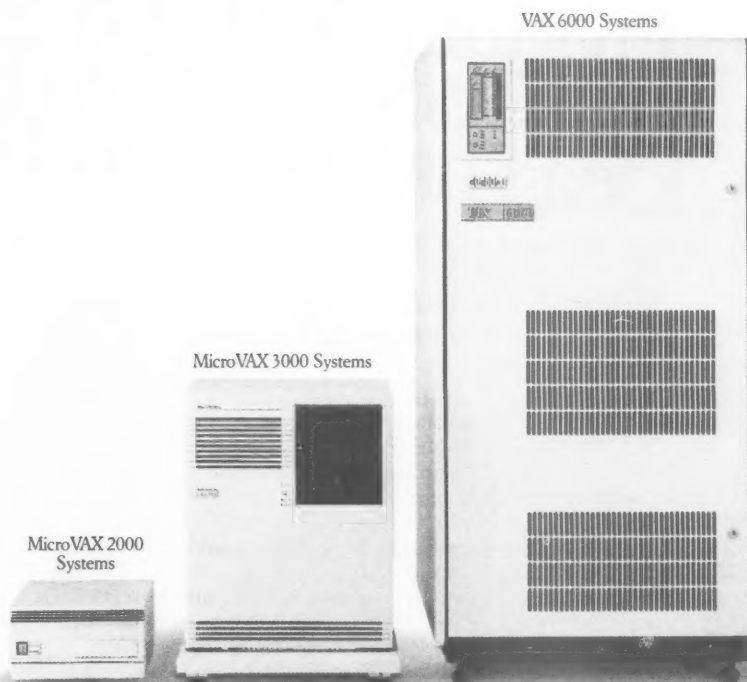
The danger to MIS managers is more subtle but no less real. Top executives don't appreciate spending money on systems that go unused. They don't appreciate hearing marketing directors and production vice-presidents complain about an IS group being off in its own little high-tech world. They don't want and don't care about systems. They want the promise of the systems — information that meets users' needs quickly, accurately and conveniently.

They will reward those who deliver the promise. The career equivalent of Chapter 11 awaits those who don't.



digital™

Only  
Digital's VAX™  
computing solutions  
let you grow  
from a \$5,000 system  
to a \$10,000,000 system.



Without  
rewriting software.

To find out how, call your local Digital sales office,  
or to get the latest VAX product information, call

1-800-369-8000

Digital  
has  
it  
now.

Before Starting Your  
File On Our Workstation  
Communications  
Products, You May Want  
To Chew A Bit On The  
Idea That Inspired Them.



If you deliver a product that's good, fast and reliable, you're going to make a mark in your industry. That was true for Domino's Pizza,<sup>®</sup> and it's true for DCA<sup>®</sup> and our Workstation Communications products. Our IRMA,<sup>™</sup> MacIRMA<sup>™</sup> and CROSSTALK<sup>®</sup> products are nothing if not good, fast and reliable. Shouldn't you start a file on us? After all, there are a lot of interesting things cooking at DCA. **DCA.**

## INSIDE THE INDUSTRY

# DCA: More Than Just Irma

122 Computer Systems News

PRODUCTS

Monday, November 14, 1988

## DCA Links Macintosh To Mainframe

**BY JOHN THOMPSON**  
ANAHEIM, CALIF. — Digital Communications Associates Inc. has introduced a software package for Apple Computer Inc. that lets IBM mainframe applications data be accessed on a Macintosh using that system's graphical format.  
The software package could prove to be a business commu-

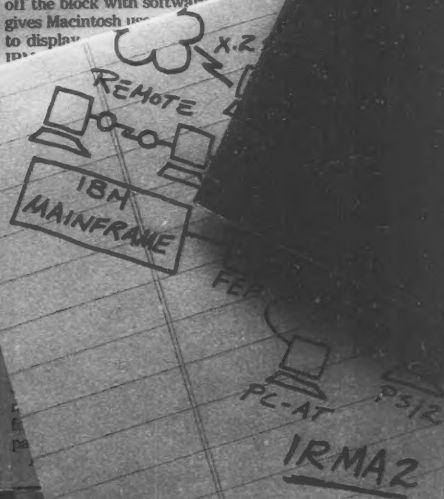
popular graphics...  
It gives Mac...  
face the Macin...  
The package...  
Apple's Mac...  
3270-like...  
then able to...

A Pocket Guide  
to DCA's Workstation  
Communications

## DCA To Bring Mainframe Graphics to Mac

By Jane Morrissey and David

Digital Communications Associates Inc. intends to be the first off the block with software that gives Macintosh users the ability to display IBM mainframe graphics.



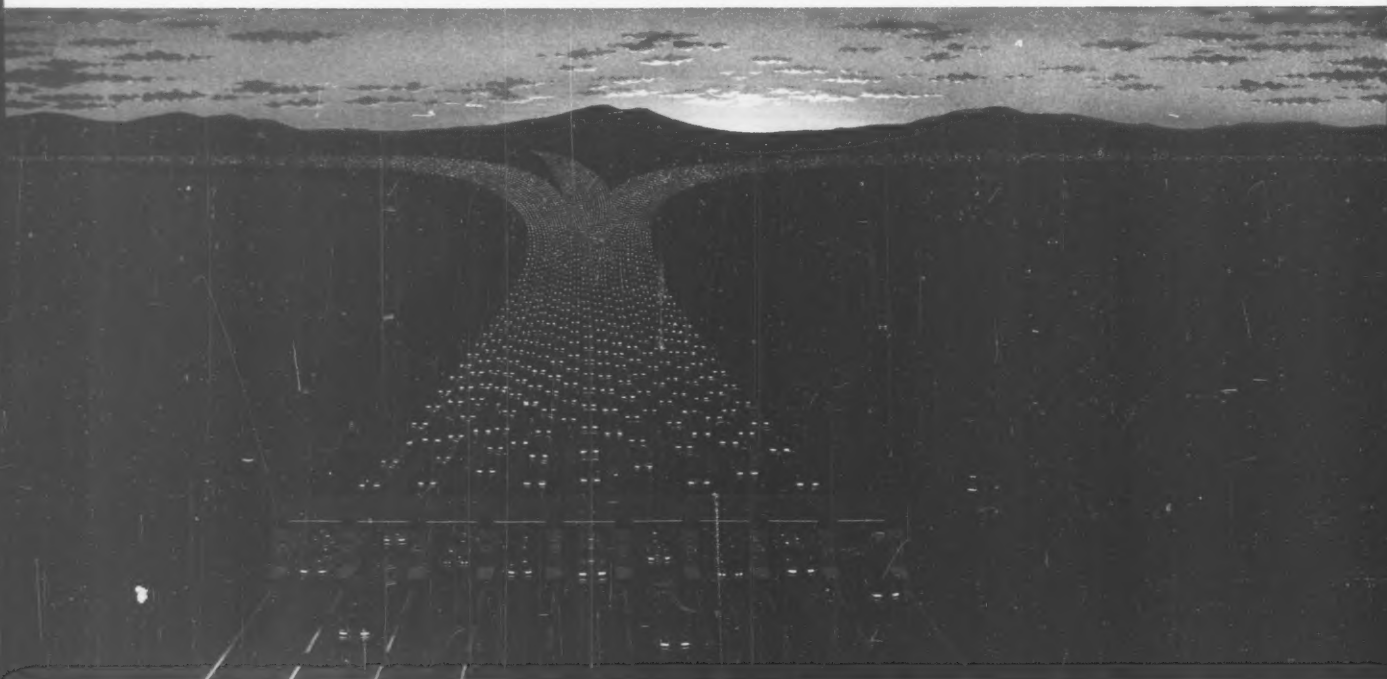
Customer Representative  
Marketing Information Group

1000 Alderman Drive  
Alpharetta, GA 30201-4199  
1-800-241-4762, Ext. 50  
Georgia 404-442-4500, Ext. 50

DCA (Workstation Communications)

DCA

If you used INGRES on your backlogs,  
you'd be home by now.



**INGRES Tools provide the fastest path through your applications jams.**

It's a fact of every MIS manager's life. Backlogs will happen. But the problem isn't the volume of applications traffic. It's how your development tools handle the load.

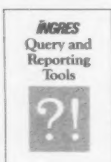
**The solution is INGRES.** INGRES Tools are part of a fully integrated environment that ties together SQL, 4GL, host languages, visual forms, and report editors in a way that dramatically accelerates the entire development process.

**Shift into high gear.** With INGRES, there's no slowing to switch tools. No need to fabricate tricky solutions. No road blocks. And once your applications are finished, they're ready to go places. Because your INGRES applications are easily portable across multiple hardware platforms.

What's more, INGRES open architecture allows you to integrate data from other data bases and systems in your applications—easily and transparently. All of which makes INGRES Tools the surest way to maneuver through applications development gridlock.

**The tools of choice.** Don't take just our word, ask DEC. They've chosen to distribute INGRES Tools to their users. You'll also find INGRES among the solutions preferred by IBM, Sun, Apple, and a long list of industry leaders. Our clients include two of the Big Three auto manufacturers, major financial institutions, oil companies, and service organizations worldwide.

**Take the fast lane.** Don't let backlogs bring your company to a standstill. Choose INGRES, and take the fast way home. For more information or to attend a free INGRES seminar in your area, call 1-800-4-INGRES.



**INGRES**  
RELATIONAL TECHNOLOGY  
Call 1-800-4-INGRES

Corporate Headquarters: 1080 Marina Village Parkway, Alameda, CA 94501, (415) 769-1400  
International Headquarters: 99 Kings Road, London SW3 4PA, UK, 44-(1) 351.7733

INGRES, INGRES TOOLS, INGRES OPEN ARCHITECTURE and RELATIONAL TECHNOLOGY are registered trademarks of Relational Technology, Inc. DEC, IBM, Sun and Apple are registered trademarks of respectively Digital Equipment Corporation, International Business Machines, Sun Microsystems, Inc., Apple Computers, Inc. ©1989 Relational Technology, Inc. Printed in USA.

**Digital  
NEWS  
50**  
A Top-Ranking Company  
in the DEC Marketplace



# SYSTEMS & SOFTWARE

## SOFT TALK

Howard Fosdick

### SAA issues bubble up



IBM's Systems Application Architecture (SAA) promises transferability of knowledge across systems,

a common user interface, transportability of code and a common programming interface. But while the architectural differences may be papered over for the user, a technical support person working with the various SAA databases will have to know how to deal with not only one relational database management system but four. Beyond the soothing SAA platitudes, there are real programming issues that will have to be addressed.

In most development projects, the underlying database determines compatibility across systems. Without compatible database managers, you just can't have application-level compatibility. Version 1.1 of the OS/2 Extended Edition Database Manager makes it possible to compare it with DB2, SQL/DS and SQL/400.

Overall, my conclusion is this: Database Manager SQL is the same as that in IBM's mainframe products, as far as end users and application program-

*Continued on page 32*

## RDBMS a dead end?

Object-oriented tech boosts spark user debate

### ANALYSIS

BY AMY CORTESE  
CW STAFF

At a recent symposium, proponents of object-oriented technology assailed the relational model for data management, declaring, "Relational is a dead end."

However, users at the Fifth International Congress on CIM Databases dismissed academic arguments on the merits of object-oriented vs. relational technology, preferring instead to focus on relevant issues of implementation today.

"The real issue is trying to get data under control, whether

object-oriented or flat-file," said Rick Hyman, staff engineer at conference participant Eastman Kodak Co. Computer-integrated manufacturing (CIM) is one area in which proponents of object-oriented programming expect great acceptance.

Many users expressed the view that whether or not object-oriented technology is the way of the future, relational systems are a reality today. "Relational is not something we will throw out," said Roger Burkhardt, price analyst at Deere & Co.'s Deere Technology Services.

But observers said the emergence of object-oriented tech-

*Continued on page 28*

## IBM, third-party storage price cuts regarded as lure

BY ROSEMARY HAMILTON  
CW STAFF

IBM and third-party suppliers have been chopping prices on expanded storage for 3090 mainframes to lure users, many of whom reportedly are taking a slow man's approach to expanded storage implementation.

EMC Corp. recently became the latest price slasher. The firm, which began volume shipments on 3090 expanded storage last month, will offer a \$60,000 price break to users purchasing 64M-byte expanded storage modules by June 1. That

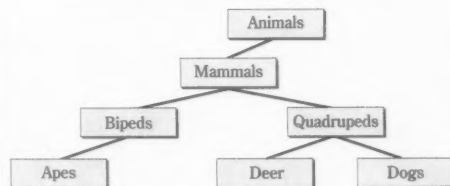
will bring the price down to \$97,500.

In February, IBM cut the price of its offering from \$225,000 to \$185,000 for a 64M-byte increment. It also announced a deal to give users an additional \$50,000 off their purchase if it is made by June.

### If only

"If I had a choice, I wouldn't buy it," said John Wood, director of computer operations at the Royal Bank of Canada in Toronto, where 384M bytes of expanded storage has been installed on two 3090 Model 400Es. "We aren't

## Building blocks



In object-oriented programming, the basic building block is an object that combines data and functionality in a single entity. For instance, the object "animal" contains descriptive data about an animal as well as operations that it performs, such as eating and running, noted Dataquest, Inc. and Ontologic, Inc. in a joint report.

Objects are grouped into classes that share characteristics and behaviors. For example, four-legged mammals are grouped in the quadruped class. Classes are organized in a hierarchy from general to specific, with a class inheriting the behavior of the class it descends from. Dogs are quadrupeds, which share the characteristics of the larger class of mammals.

By isolating relevant information within the object, a method called encapsulation, the programmer is freed from details of implementation. This allows different objects to respond to the same generic commands in their own unique way, as defined by the instructions contained in the object. For instance, when asked to run, the quadrupeds would respond to that generic command differently than the bipeds. Moreover, a deer would respond slightly differently than a dog.

Object-oriented design allows reuse of code and simplifies changes. If a programmer wanted to add humans under bipeds, only information that humans do not share with the group "bipeds" would need to be coded.

AMY CORTESE

### Inside

- Atlantic Casualty gains time. Page 25.
- Programming pioneer still on track. Page 25.
- Software AG unrolls Data Center Management series. Page 32.

EMC customers yet, but we're considering them for the price."

Expanded storage is a key component of IBM's Enterprise Systems Architecture (ESA) strategy and, as a result, is an important sell for IBM.

However, according to David Vellante, who is an analyst

*Continued on page 28*



## PLATINUM Database Analyzer™ for DB2

### PROBLEM - Managing physical DB2 objects

One of the problems confronting you, the DBA, is managing the physical DB2 objects within your DB2 system(s). To maintain an efficient system, you must tune the object's definition, monitor the space usage and growth of the objects, and verify the integrity of the objects.

DB2 does not provide the facilities necessary to perform effective management of your DB2 physical objects. DB2 does not maintain sufficient space statistics or space usage history, provide update activity and freespace usage information, or provide a mechanism for verifying the integrity of DB2 objects and easily correcting problems when they occur. DB2 leaves those tasks to you.

### SOLUTION - PLATINUM Database Analyzer

PDA is a DB2 DASD and database monitoring, analysis, verification, and tuning tool. It provides you with all the necessary tools to manage physical DB2 objects.

PDA is the most comprehensive set of tools available for managing DB2 objects, all in one package, all from one vendor.

Call for more information or a FREE PRODUCT EVALUATION.



1-800-442-6861

PLATINUM technology, inc.  
The DB2 Company™



THE DB2 DATABASE WATCHDOG

555 WatersEdge Drive

Lombard, IL 60148

(312) 620-5000

# Walker, Tesseract,

# IBM

Present

## How To Benefit From DB2 and SAA Today

### A One-Day DB2 and SAA Solutions Conference

DB2 and SAA can benefit your organization today. This DB2 and SAA Solutions Conference will explore how. It's part of our commitment to establishing the next era in data processing.

#### Discover The Total Solution — Financial and HRMS Software

Walker Interactive Systems and Tesseract Corporation bring specialized applications expertise to this conference — Walker in financial software, Tesseract in human resource management systems. That's why IBM has selected them as business partners to demonstrate the advantages, availability, and implementation of DB2 financial and HRMS system solutions.

#### The DB2 and SAA Solutions Conference Will Help You:

- Learn directly from IBM the implications of recent announcements concerning DB2, SQL, SAA, and much more
- Investigate the breadth of DB2 financial and HRMS functionality available today from Walker and Tesseract
- Explore migration strategies for converting financial and HRMS systems from current environments to DB2
- Learn the newest DB2 performance benchmarks and their meaning for DB2 production environments
- See a demonstration of the industry's most advanced Cooperative Processing workstation product.

- Discover why DB2 is the optimal DBMS for manipulating and querying financial and human resource databases
- Participate in on-line product demonstrations of DB2 financial and HRMS applications

#### Bring Your Team

For maximum results, assemble your team from data processing, finance, and human resources and attend the DB2 and SAA Solutions Conference together.

#### Conference Schedule

City	Date	City	Date
San Francisco	May 2	Washington, D.C.	June 13
Minneapolis	May 9	Philadelphia	June 15
New York	May 18	Boston	June 20
Chicago	May 23	Atlanta	June 22
Toronto	June 1	Dallas	June 27
Kansas City	June 6	Los Angeles	June 29
Detroit	June 8		

#### Attend This Conference At No Cost — Register Today

The DB2 and SAA Solutions Conference is offered at no charge. Register by calling the DB2 and SAA Solutions Conference Registration Desk at (415) 495-8866. Or Write: DB2 and

SAA Solutions Conference,  
Marathon Plaza Three  
North, 303 Second Street,  
San Francisco, CA 94107.





**YES**, I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business Basic Rate: \$48 per year

\*U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

**COMPUTERWORLD**

E4914-2



**YES**, I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business Basic Rate: \$48 per year

\*U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

**COMPUTERWORLD**

E4914-2

1. **BUSINESS/INDUSTRY** (Circle one)
- 10. Manufacturer (other than computer)
  - 20. Finance/Insurance/Real Estate
  - 30. Medicine/Law/Education
  - 40. Wholesale/Retail/Trade
  - 50. Business Service (except DP)
  - 60. Government — State/Federal/Local
  - 65. Communications Systems/Public Utilities/Transportation
  - 70. Mining/Construction/Petroleum/Refining/Agric.
  - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
  - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
  - 90. Computer/Peripheral Dealer/Distributor/Retailer
  - 75. User/Other \_\_\_\_\_
  - 95. Vendor/Other \_\_\_\_\_
- (Please specify)

2. **TITLE/FUNCTION** (Circle one)
15. **MIS/DP MANAGEMENT**
- 18. Vice President/Asst. VP
  - 21. Dir. Mgr. Suprv. MIS/DP Services
  - 22. Dir. Mgr. Suprv. of Operations/Planning
  - 23. Dir. Mgr. Suprv. Analyst of Systems
  - 31. Dir. Mgr. Suprv. of Programming
  - 32. Programmer/Methods Analyst
  - 35. Dir. Mgr. Suprv. QA/QP
  - 38. Data Comm. Network/Systems Mgt.
- OTHER COMPANY MANAGEMENT**
- 11. President/Owner/Partner/General Mgr.
  - 12. Vice President/Asst. VP
  - 13. Treasurer/Controller/Financial Officer
  - 41. Engineering/Scientific R&D Tech Mgt.
  - 51. Sales/Mktg. Mgt.
- OTHER PROFESSIONALS**
- 60. Consulting Mgt.
  - 70. Medical/Legal/Accounting Mgt.
  - 80. Educators/Journalists/Librarians/Students
  - 90. Others \_\_\_\_\_
- (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant:
- A. Mainframes/Supermains
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems
  - F. No Computer Involvement

1. **BUSINESS/INDUSTRY** (Circle one)
- 10. Manufacturer (other than computer)
  - 20. Finance/Insurance/Real Estate
  - 30. Medicine/Law/Education
  - 40. Wholesale/Retail/Trade
  - 50. Business Service (except DP)
  - 60. Government — State/Federal/Local
  - 65. Communications Systems/Public Utilities/Transportation
  - 70. Mining/Construction/Petroleum/Refining/Agric.
  - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
  - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
  - 90. Computer/Peripheral Dealer/Distributor/Retailer
  - 75. User/Other \_\_\_\_\_
  - 95. Vendor/Other \_\_\_\_\_
- (Please specify)

2. **TITLE/FUNCTION** (Circle one)
15. **MIS/DP MANAGEMENT**
- 18. Vice President/Asst. VP
  - 21. Dir. Mgr. Suprv. MIS/DP Services
  - 22. Dir. Mgr. Suprv. of Operations/Planning
  - 23. Dir. Mgr. Suprv. Analyst of Systems
  - 31. Dir. Mgr. Suprv. of Programming
  - 32. Programmer/Methods Analyst
  - 35. Dir. Mgr. Suprv. QA/QP
  - 38. Data Comm. Network/Systems Mgt.
- OTHER COMPANY MANAGEMENT**
- 11. President/Owner/Partner/General Mgr.
  - 12. Vice President/Asst. VP
  - 13. Treasurer/Controller/Financial Officer
  - 41. Engineering/Scientific R&D Tech Mgt.
  - 51. Sales/Mktg. Mgt.
- OTHER PROFESSIONALS**
- 60. Consulting Mgt.
  - 70. Medical/Legal/Accounting Mgt.
  - 80. Educators/Journalists/Librarians/Students
  - 90. Others \_\_\_\_\_
- (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant:
- A. Mainframes/Supermains
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems
  - F. No Computer Involvement





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

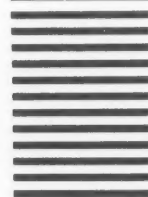
POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



## Tandem goes to Relational DBMS tools

BY J. A. SAVAGE  
CW STAFF

CUPERTINO, Calif. — Betting that Relational Technology, Inc.'s SQL database tools will ease application development and access to systems based on open standards, Tandem Computers, Inc. recently agreed to co-develop a product to run on its Nonstop SQL relational database management software.

"It might help us in the future," said Tony Rigney, systems analyst at the Eugene, Ore.-based retailer Emporium, Inc. Rigney said he expects to improve ease of use by using SQL on his three-CPU Tandem TXP in the next couple of years.

"It should improve the overall usability of Tandem products," said Peter Kastner, vice-president of Boston-based consultant The Aberdeen Group, Inc. He said the move is another great stride in reducing the visibility of Tandem's proprietary operating system.

Products are expected to be available in the first quarter of next year at prices comparable to those of current Relational products.

The agreement does not preclude either side from making similar agreements with other vendors. Relational, according to Robert Healy, the company's vice-president of marketing, made similar agreements with Digital Equipment Corp. and Data General Corp.

## Playing with the speed of MIPS

Insurance firm saves time and money after installing DG MV/40000

ON SITE

BY JAMES DALY  
CW STAFF

GOLDSBORO, N.C. — Forty-five seconds may seem a mere dust speck in the eyes of Father Time. Scientists say the Earth just passed its 20 millionth birthday; heck, there's even a gnarled bristlecone pine tree that has staked out its turf in the California mountains for more than 46 centuries.

But if you're a foot-tapping MIS manager helplessly watching 75 programmers wait the better part of a minute for a seriously overworked system to respond to a command, 45 seconds can seem like an afternoon slogging through wet concrete.

That's just the situation in which the staff at Atlantic Casualty and Insurance Co. found themselves recently. And it was driving Senior Vice-President Ed Steed crazy.

"Something had to be done," Steed said, a tinge of desperation still coloring his voice. "Not only were we getting many delays, but we had gotten to the point where we had to schedule any processing because it would degrade the systems so badly."

By late last year, the problems with Atlantic Casualty's 4-year-old Data General Corp. MV/10000 had become chronic: Some reports were taking up to

10 hours to run.

Such computational foot-dragging was not only frustrating, it was hurting business. Atlantic Casualty is a 6-year-old company specializing in what it calls nonstandard automobile insurance. The typical insurance company may balk at issuing insurance coverage to a driver in the Indy 500. Instead, the would-be Mario Andretti calls someone like Atlantic Casualty.

If the system is gummed up, it hobbles the firm's ability to



process the flood of policies coming in every day. But last October, DG announced its high-end MV/40000, and it seemed to be just the tonic for Atlantic Casualty. Although the all-DG shop had kicked around the idea of upgrading to the MV/20000, it was thought that the computational needs of the rapidly expanding company would soon exhaust even that machine.

So in early January, Atlantic Casualty became one of the first companies to take delivery of an MV/40000. Using the MV/10000 to obtain a \$150,000 trade-in credit, the firm obtained the MV/40000 for approximately \$500,000.

After three weeks of being poked, prodded and put through the paces, the new system went on-line. The difference between the MV/10000, which is said to process 2.5 million instructions per second (MIPS), and the 14-MIPS MV/40000 was dramatic. The familiar delays evaporated. Response time was down to less than four seconds, and reports

of coffee while compiling," said senior programmer Larry Saulmon. "Now it's always waiting on me."

The MV/40000 also allowed for a more efficient distribution of personnel. "We cut three people from one department and put them in another department," Steed said. "So it's a real money saver."

Another added bonus was that the new system takes up less space in the data center, giving MIS staffers more elbow room.

Steed said he expects the newcomer to satisfy Atlantic Casualty's computational needs "for the next decade, at least" because of its added capabilities and room for growth. As many as four processors can be added to the MV/40000, giving the firm's uniprocessor version the potential to handle up to 50 MIPS.

### Further investigation

Steed added that he will give DG's new Avion line of workstations a hard look when they arrive this summer and said there is a good possibility that several of those machines — which can process up to 17 MIPS — will be tied into the MV/40000 network.

Data General has also added a number of features that will make the MV/40000 beneficial in high-volume commercial settings. These include an upgraded version of their AOS/VS operating system, a high-speed channel system and a separate diagnostic processor.

In addition, Steed received a touch of extra security. DG has thrown in a seven-day, 24-hour maintenance plan for the MV/40000, which covers all operating software and processors for one year.

## Pioneer still blazing linear program trail

BY MITCH BETTS  
CW STAFF

WASHINGTON, D.C. — Today's business executives may not be aware of it, but the computer models they use for complex planning decisions can be traced back to the 1947 invention of linear programming by mathematician George B. Dantzig.

Dantzig, 74, was honored last month with the 1989 Coors American Ingenuity Award for his invention, which was one of the first business applications devised for the computer.

In essence, linear programming is a decision-support tool that is ideal for resource allocation, Dantzig explained in an interview here. Oil companies, for example, have used linear pro-

gramming to schedule tanker fleets, blend gasoline, design port facilities and create financial models.

Linear programming produces a computer model that takes into account all the variables of a manufacturing, scheduling or planning problem and sorts the possible scenarios to identify the most efficient solution.

**On to the next generation** Dantzig, professor of operations research and computer science at Stanford University, and his students are now working on the next generation of linear programming: combining it with parallel processing computers to evaluate even more variables.

For the Electric Power Research Institute in Palo Alto,

Calif., Dantzig's team is developing a computer model of the West Coast's utility systems to help them exchange electricity and thus alleviate temporary shortages.

"That's an example of planning under uncertainty, because you don't know how many generators are going to go down, you don't know how many transmission lines are going to fail, and you don't know whether demand is going to go up or down," Dantzig explained.

"There are literally millions of things that can happen," so the possible scenarios are simulated and then sampled by parallel processors. "You can have as many processors as you want doing the sampling all at the same time, so it's one of the most natural applications of parallel processing," Dantzig said.

The researcher also sees a

good fit between linear programming and artificial intelligence. Combining a rules-based expert system with linear programming would be especially useful when the expert system comes up with numerous options that must be



Stanford's Dantzig

evaluated. The combination would yield a truly intelligent expert system, according to Dantzig.

The Coors American Ingenuity Award, sponsored by Adolph

Coors Co., previously went to Jack Kilby, creator of the first silicon computer chip, and John Atanasoff, regarded by many as the inventor of the digital electronic computer.

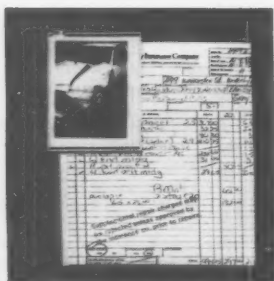
Dantzig came up with his idea for an operations-planning model after World War II, when he worked for the U.S. Department of Defense. The Defense Department wanted to automate its deployment and manpower planning.

In the early 1950s, with the advent of computers, the petroleum industry latched onto Dantzig's invention. "They started out with the simple problem of how to blend the gasoline for the right flash point, the right viscosity and the right octane and try to do it in the cheapest way possible. So that was a natural application," he said.

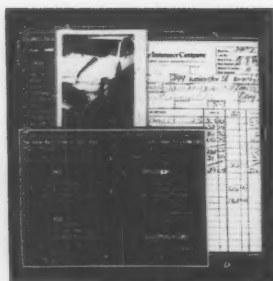
Linear programming was also a key development in the field of operations research, which deals with the application of scientific methods to decision making, especially resource allocation.



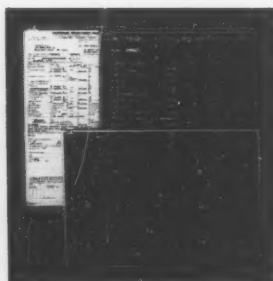
# A BETTER IMAGE CAN DO WONDERS FOR CUSTOMER SERVICE. AND THAT'S NO IDLE CLAIM.



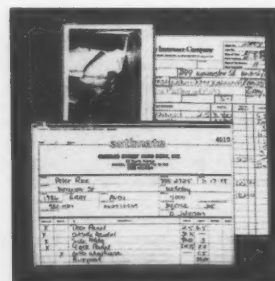
*There's a fender bender on a freeway. The adjuster comes out and takes a picture of the damage. And signs off on an adjustment.*



*The handwritten document and the photo—the images—both go back to the home office via electronic mail.*



*Touch a button and you have a data window, a text window, an image window right in front of you. Presto!*



*A guy in the field wants to verify the estimate. Click! The adjuster's handwritten report, the estimate, and the photo are right there on the screen.*





Claims processing.

Until now, it's been pretty much a hit or miss affair. Waiting for documents, verifying estimates. Signing off adjustments.

But with Wang's Integrated Image System, you

## INTEGRATED IMAGING

can process an accident claim in a fraction of the time.

WIIS gives your people immediate access to the information they need, where and when they need it. In the office or in the field.

With the press of a button up comes an image window, text window, data window. Simultaneously. And it's integrated information. With your FAX machine. Your electronic mail. Your company's computer system.

Wang's Integrated Image System.

What it can do for your image it can do for your customer service.

And that's no accident.



*The entire claim processed in half the time. That's Integrated Imaging and Wang has it!*

**WANG**

**MAKES IT WORK**

For more information, contact your local Wang Sales Office.  
Or write Wang Laboratories, Attn: Inquiry Service, M.S. 014-03C, One Industrial Avenue, Lowell, MA 01851. © 1989 Wang Laboratories, Inc.

## Storage cuts

CONTINUED FROM PAGE 23

at market research firm International Data Corp. in Framingham, Mass., customers have not flocked to expanded storage as IBM had hoped.

"The real demand for expanded storage hasn't hit yet and won't until ESA is fully operational. So IBM had to make a move in the interim," he said, in reference to the price cuts. "They had to make it more palatable for users."

Vellante said approximately 50% of large IBM shops had not purchased any expanded storage by late last year.

EMC officials also attributed the IBM price cuts to slow-moving users. "They

basically gave away ESA at first, but from a hardware point of view, people weren't moving quickly to ESA," said Brian Fitzgerald, an EMC spokesman.

Two other 3090 users contacted said they have not made any expanded storage purchases yet and would consider vendors other than IBM if those vendors proved to be reliable and could offer a lower price.

Louis Mickler, data center manager at Pacific Telecomm, Inc. in Vancouver, Wash., said he found the pricing of expanded storage very high, but he intends to purchase it once he moves to ESA. At that time, he said, he will shop for the best price he can find. "I'm not saying we'll choose someone else, but we will look at other vendors' options," he said.

## RDBMS

CONTINUED FROM PAGE 23

niques today is analogous to the advent of relational database technology 15 years ago. At first, supporters of the incumbent network model rejected the new relational model. As it became apparent that relational would catch on, however, some vendors started implementing and most started claiming relational features.

While object-oriented programming has the potential to revolutionize the way software is developed, it is in danger of becoming a term that vendors will tack on to breathe new life into tired products.

Object-oriented design tears down the traditional tenets of structured program-

ming and examines the problem of programming with a fresh perspective — one that more closely models the way things are in real life, its advocates say. This type of programming has been around for a decade and has paved the way for the new generation of graphical user interfaces ushered in by Apple Computer, Inc.

When applied to database management systems, object-oriented programming promises advantages over traditional methods of data management, resulting in applications that are easier to develop and maintain, according to proponents. Moreover, object-oriented database systems can incorporate relational concepts — a relation being just another object type.

Object-oriented DBMSs are particularly well suited for applications with many complex data types. So it is not surprising that the initial adoption of the technology has largely been complex engineering design and manufacturing applications.

Dataquest, Inc., a San Jose, Calif.-based market research firm, predicted that object-oriented database design will first be applied to computer-aided design, computer-aided software engineering and CIM applications and will dominate those segments by the mid-1990s.

### A can-do system

David Pendleton, manager of the artificial intelligence program at the U.S. Department of Commerce's National Charting Research and Development Laboratory, contended that an object-oriented database can do anything a relational DBMS can, but essentially, the two are tools for slightly different problems.

"Object-oriented [technology] is good for highly complex applications with diverse and complex data types, while relational is suited for business-processing applications with a restricted number of data types," Pendleton said.

The lab has been using Servio Logic Corp.'s Gemstone object-oriented database for two years as one of the firm's beta customers.

Pendleton employs object-oriented programming along with AI techniques to partly automate the creation of navigational charts, which are produced by the department and used to guide the country's aircraft and ships. This task currently requires hundreds of cartographers to draw maps by hand.

### Discrete technology

Pendleton said object-oriented technology, as a software engineering technique, is useful for incorporating AI and rule-based systems. It is also natural for thinking of a problem in its discrete components and modeling that on the computer, he said.

Pendleton explained that while an entire chart is an object, it can be broken down into subobjects such as land areas and water and even further into shipwrecks, piers and other hazards of navigation. By sending a message to these objects, they can "draw themselves" to provide a first-cut chart for the cartographer, he said.

In this application, a shipwreck is an object, which could not be represented in the same way by character-based data types, Pendleton noted. The expert system comes in to play when the objects "decide" how best to portray themselves based on the situation.

# SEVENTY BILLION LINES OF COBOL ARE A TERRIBLE THING TO WASTE.

COBOL systems dominate the world's business, with more than 70 billion lines of code. And a million experienced programmers. So why change languages when you develop for the personal computer? Why add a small step called "rewrite the whole system" to each development project? The effect on budget, schedules, standards and staff is painful—and unnecessary.

Realia offers full PC emulations of the tools you know: Realia COBOL, RealCICS, RealDL/I. With no conversion and no retraining, you can move big existing systems to the PC for development, then upload them to the mainframe—or leave them on the PC—for production.

With Realia, COBOL becomes for the PC what it has always been for the mainframe: powerful, flexible, and above all maintainable. Realia's compiler generates highly optimized machine code, with speed and compactness unmatched among PC COBOLs. You get the performance levels of Pascal or C, without the cryptic operators and the learning curve.

Realia also ends your frustration with mainframe programming utilities. Ours are fast, intuitive, full-screen and full-color. From screen manager to BMS map editor to source-level debugger, these tools eclipse anything available on the mainframe.

See for yourself. Call for a *free* 30-day evaluation.

## REALIA®

10 South Riverside Plaza, Chicago, IL 60606, 312/346-0642  
34 North End Road, Hammersmith, London W14 0SH, England, 01/602-8066  
1284 Wellington Street, Ottawa ONT K1Y 3A9, Canada, 613/725-9212



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 13340 PITTSBURGH, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Duquesne Systems Inc.  
Two Allegheny Center  
Pittsburgh, PA 15212

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES





**For fast delivery, reply today.**

- ☐ **Yes**, we want more information about BUNDL for System Managed Output.

We want information about the Automated Operations products from Duquesne Systems:

- ☐ **AutoMate/MVS**—automates and manages console operations and enhances system operations productivity.
- ☐ **Multi-image Manager**—simplifies, protects and controls sharing of DASD, tape drives and consoles in a multiple CPU or multiple image environment.
- ☐ **CheckOut/VM**—assures the availability of system hardware and software components and restarts unavailable components.

Date \_\_\_\_\_

Name \_\_\_\_\_  
(Please Print)

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

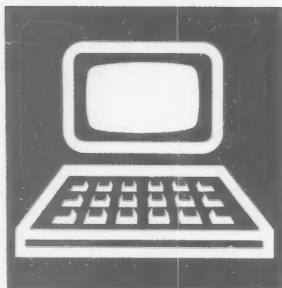
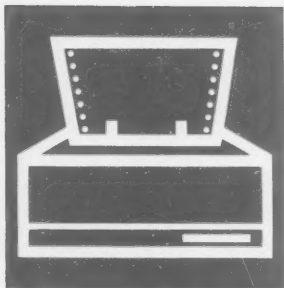
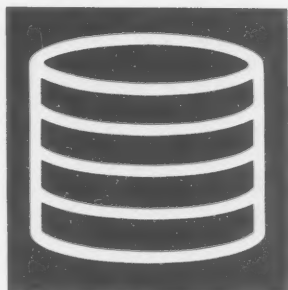
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Operating System \_\_\_\_\_ No. of CPUs \_\_\_\_\_

CW040389

# BUNDL<sup>®</sup> DELIVERS!



## Automated report distribution the way you want it.

Department A gets the whole report. Location B receives only its pages. Supervisor C needs the location summaries from all applications combined — online. BUNDL delivers exactly that. On time. Every time.

### System Managed Output

Just automating MVS report distribution is not enough. BUNDL is an all-in-one product that brings automation to the production, archiving and online viewing of reports.

BUNDL puts MVS to work and puts you in control. It eliminates manual tasks and unneeded reports. It eliminates reruns. It bundles reports from multiple applications.

### WYNIWYG

What You Need Is What You Get. BUNDL is effective because it gets users involved. BUNDL's online View facility lets them look at reports. Rearrange information. Produce reports on paper or fiche. Or archive reports for printing or reprinting later.

### Leading in Automation Technology

Multi-image Manager in 1981. AutoMate in 1987. CheckOut/VM in 1988. Now BUNDL in 1989. We've become the recognized leader in the technology and support of Automated Operations.

Don't wait for automated report distribution. For delivery, call **412-323-2600** and ask for your Duquesne Systems account representative.



**DUQUESNE  
SYSTEMS**

Two Allegheny Center  
Pittsburgh, PA 15212

```

CREDIT CLIMATE GLOBAL
Command ***

STUDY OF GLOBAL WARMING

Weather Station: 6607      Elevation: 6267      (feet)
Observation Time: 08:00    Observation Date: 01/22/99

WIND Direction: 180E      (degrees S.E.W.)   Wind Speed: 12      (mph)
Temperature: 70.00        (degrees Fahrenheit)   Humidity: 60.00      (degrees Celsius)
Precipitation: 0.00      (inches)      Type: 1 1 1 1 1 1 1 1 1 1
Barometric Pressure: 30.00      Hg/1013.25 mbars
Relative Humidity: 60.00
Comments:

```

**Practicing Physicians**

per 100,000

State	Practicing Physicians per 100,000
Alaska	107,141
Montana	95,752
Wyoming	94,136
Idaho	45,947
Utah	34,630

**Shewhart Chart for Diameter**

High Humidity      Low Humidity      High Humidity      3 $\sigma$  Limits For n=6

**Avg Diameter**

UCL=4.73      UCL=4.34

LCL=4.23      LCL=3.94

**Std Dev**

UCL=.61      UCL=.30

LCL=.20      LCL=.0

Machine      A396      A455      ●●● G334

Jul 01 04 07 10 13 16 19 22 25 28 31

ACTIVITY	FEB 01	FEB 08	FEB 15	FEB 22	MAR 01	MAR 08
Primary Burner	[Solid black bar]					
Primary Heater	[Solid black bar]					
Primary Damper	[Solid black bar]					
Secondary Burner	[White bar with black outline]					
Secondary Heater	[White bar with black outline]					
Secondary Damper	[White bar with black outline]					
Forced Draft Fan	[White bar with black outline]					

LEGEND

1. DURATION OF A NORMAL JOB  
 2. SLACK TIME FOR A NORMAL JOB  
 3. DURATION OF A CRITICAL JOB

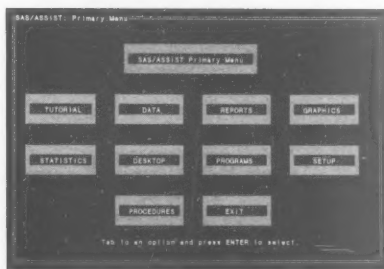
Month	Value (In Thousands)
Jan	12,000
Feb	12,000
Mar	12,000
Apr	12,000
May	12,000
Jun	12,000
Jul	12,000
Aug	12,000
Sep	12,000
Oct	12,000
Nov	12,000
Dec	12,000

[illegible]

### Applications Development



# Make That Seven.



*A free menu-driven interface to SAS System applications*

Discover the potential of workstation computing with the SAS System. No other software brings you more choices for managing, analyzing, and presenting your data. All fully integrated. All yours for 30 days—free.

And now all this power is even easier to use. We've added convenient front-end menus that put you at the center of SAS System productivity in just seconds... whether you're a first-time user or a seasoned pro.

**Choices to Build On.** The modular design of the SAS System lets you tailor your software for individual, departmental, or company-wide computing needs. Start with essential data management and reporting tools. Then expand your range of applications with solid statistics, attention-getting graphics, reliable forecasts, and more. You can even

customize these applications—or design your own—using the SAS System's built-in applications development tools.

**Choices to Rely On.** With every SAS System application, you can receive expert technical support, documentation, training, and consulting services. More great reasons to choose the SAS System.

In fact, there are *hundreds* of reasons why more than a million software users—in thousands of organizations—have made the SAS System their #1 choice. Now it's your turn.

For a free 12-page SAS System executive summary, just give us a call at (919) 467-8000. We'll also tell you how you can receive SAS software for a free 30-day evaluation. In Canada, call (416) 443-9811.

**The SAS® System.  
More Choices  
for More Applications  
than Any Other Software.**



SAS Institute Inc.  
Software Sales Department  
SAS Circle ☐ Box 8000  
Cary, NC 27512-8000  
Phone (919) 467-8000 ☐ Fax (919) 469-3737

The SAS System runs on IBM PCs and compatibles; on Sun Microsystems, Inc. and Hewlett-Packard workstations; on IBM and compatible mainframes; on Digital Equipment Corp. minicomputers and workstations; and on Prime Computer, Inc. and Data General Corp. minicomputers.

Copyright © 1989 by SAS Institute Inc. Printed in the USA.

## Fosdick

CONTINUED FROM PAGE 23

mers are concerned. This provides the benefit of knowledge transfer. But when you analyze the tasks of database administrators and systems programmers, Database Manager SQL has little in common with its larger relations. The systems support staff gains little from SAA.

Let's compare the SQL languages. The Data Manipulation Language is identical between the OS/2 Database Manager, DB2 and SQL/DS. The Data Definition Language (DDL) diverges. The DDL that defines logical objects (tables, views, indexes) is the same. But the

DDL for physical objects is totally different. The OS/2 Database Manager isolates the user from physical storage in the manner of other personal computer-based products.

However, there are similarities: Application programming with the OS/2 Database Manager is the same as with the other database products. Just as important, the Database Manager has the same transactional control facilities as do its mainframe counterparts.

Many MIS evaluators are stunned when they grasp the fact that the OS/2 Database Manager supports transactional programming. But they shouldn't be, since all the database products must have transactional capability for IBM to be able to follow through on its promise

of a distributed database.

However, about the kindest thing one can say about the Database Manager catalog is that it is no more different from that of DB2 than is the SQL/DS catalog. While DB2 has about 30 catalog tables, SQL/DS has roughly 15 and the Database Manager nine.

Only seven or eight of the catalog tables directly correspond among the three products, and even then column names differ. Given the central role of the catalog, these differences constitute an incompatibility between DBMSs that IBM will likely never resolve.

Database utilities also fail the SAA test. DB2 has its utilities, "service aids" and the underlying OS and VSAM utilities. SQL/DS has its DBSU utilities, sup-

ported by CMS commands and other VM utilities in a VM environment. The OS/2 Database Manager offers easy-to-use utilities called Query Manager Tools.

The OS/2 Database Manager contains utilities that support the same functionality as their mainframe counterparts, but the exact manner in which the utilities are invoked and executed and their precise effects varies. These differences mean that SAA does not support transportability of utilities jobs.

The OS/2 Database Manager also differs from the mainframe DBMSs in that it includes a built-in applications generator called the Customized Interface.

This fourth-generation language is similar in concept to IBM's Cross Systems Product (CSP): You define an application by defining a series of objects. However, the actual use of the Customized Interface shows little similarity to CSP.

The last critical area to mention is that of the user interface. DB2 and SQL/DS offer QMF, the Query Management Facility. The Database Manager uses something called the Query Manager, which contains a prompted interface. QMF and the Query Manager are alike in concept but totally different in implementation. IBM is moving the Database Manager's Query Manager to the mainframe products to enhance compatibility. DB2 Version 2 Release 2 includes the Query Manager.

My bottom line is that IBM's database products, the OS/2 Database Manager, DB2, SQL/DS and SQL/400 are, indeed, a family of kindred products. However, they are not the same product. Nor will they ever be.

Fosdick is president of the Midwest DB2 Users Group and has written *Using IBM's ISPF Dialog Manager* and *VM/CMS Handbook*.

# Imagine what business would be like without these technological breakthroughs...

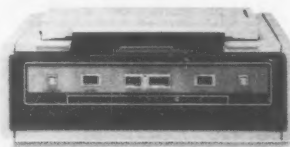
The Wright Flyer  
Dec. 17, 1903



Early Typewriter  
circa 1906



Office Photocopier  
circa 1965



# ...Now imagine what your business would be like with PREFERENCE Computer-Based Reference!

A few technological breakthroughs have made a major impact on today's business world. Without the telephone, the typewriter, a facsimile machine, the photocopier and airmail, business would just not be the same.

Now, another new development known as **PREFERENCE**, computer based reference, is revolutionizing the way business people access information.

In order for your business to work, your people need the right information at the right time. So **PREFERENCE** was developed to put the needed information at their fingertips.

From payroll to sales records, and from product information to the personnel handbook, your company

information can be stored within a mainframe computer for easy access by those who need it. This single software package, which operates in an IBM mainframe environment, permits simultaneous access from multiple applications.

**PREFERENCE** helps people create, review and distribute reference information while moving seamlessly back and forth between electronic documents and on-line applications. With the stroke of a single "help" key, needed reference material can be accessed without ever leaving an application.

Within **PREFERENCE**, information is presented consistently through an integrated package of text,

data and graphics. Off-line documentation is also available in a wide variety of formats.

At Goal Systems, we believe **PREFERENCE** will have the kind of impact on your business that the telephone, the typewriter, the facsimile machine, the photocopier and airmail have had in the past.

Once **PREFERENCE** is in place, you will find that the ongoing task of accessing and updating corporate information has become relatively easy. And you will wonder what your business ever did without it. For more information or for a free demonstration diskette, call 1-800-848-4640.



Goal Systems International Inc. • 7965 N. High Street • Columbus, Ohio 43235 • Phone 614-888-1775  
Goal Systems International S.A.R.L. • 88 avenue de Wagram • 75017 Paris, France • Phone: (1)42 67 55 55 • Telex: 641.094

## Software AG introduces data center series

Software AG of North America, Inc. has entered the data center automation software market with the announcement of the Data Center Management series.

First in the series is Natural Operations, a fourth-generation language-based scheduling system said to automatically manage and control all Data Center on-line and batch production, job flow and resources. Features include a report facility, automatic archival and on-line retrieval of job control language system messages and reports and the ability to customize menus and functions.

According to Software AG, the next two offerings in the product family will be an integrated structured programming facility and an automated operator console that will reportedly enable data centers to operate on a lights-out basis. Both products are scheduled for release later this year.

Natural Operations is available for IBM MVS and MVS/XA operations systems, supporting JES 2 and JES 3, and is priced from \$70,000. The product also runs with Software AG's Complete, as well as IBM's CICS, IMS/DC, TSO and VM/CMS teleprocessing systems.

# PCs & WORKSTATIONS

## MICRO BITS

Douglas Barney

### Vanity in the air



**No surprise here.** Every year, industry maven Esther Dyson invites the richest and brightest stars

of the personal computer industry to a remote location for several days of sunshine, deal-making and general bantering.

Panel discussions among high-profile vendor-types consume a good deal of the time, and this year, they were well-attended despite the glorious Palm Springs, Calif., weather and raucous college spring break festivities.

Maybe it was because I was inside smelling smoke and bodies instead of clean desert air, or maybe it was the tone of the panels. In either case, I was ticked off.

After hours of pap about marketing, future technology, lawsuits and distribution that were spiced with a litany of barbs, a lone MISer also had had enough. He stood up, not to ask a question but to make a point forgotten in the lust for profit. "You guys don't understand the first thing about DP," the user said, bringing a smile to the face of this MIS-bigoted reporter.

*Continued on page 38*

## Groupware ties it all together

Common need challenges IS managers to design supporting architectures

BY MICHAEL ALEXANDER  
CW STAFF

The problem with stand-alone personal computers is that they do not work like people work — in constant communication with each other. That is at least one reason why many companies are hurrying to put end users on local-area networks and organizing individual end users into cohesive work groups.

With groupware — software designed to support cooperative efforts on PC networks — end users can hold computer conferences, manage projects, create documents, design products, decide when the best time to hold meetings would be and even collectively brainstorm on creative endeavors.

"It's a change in the work en-

vironment that is so intoxicating, and [end users] are beginning to rely on it so much that they suffer withdrawal when they no longer have it," said George Gayle, PC LAN manager at Texas Commerce Bank in Houston.

#### Higgins to the rescue

The bank has been running Higgins, a groupware product marketed by San Leandro, Calif.-based Conetic Systems, Inc., for about a year on three networks consisting of 150 users.

"It has enhanced the communication capabilities of users on the network," Gayle said. "An individual can check the availability of a conference room, check the available time slots and schedule a tentative meeting in only a few minutes. It saves a lot of phone calls and cuts down

on the false starts."

The group productivity package has electronic mail, calendaring, an appointment scheduler, a project management and telephone directory and other features.

"Higgins has a fax machine feature that allows you to set up a list to send memos by fax machine to people in the field externally and via E-mail internally," Gayle said. "Try that outside of a system like this."

At Ryder System, Inc. in Miami, four work groups on LANs are using IBM's Professional Office System electronic mail system to exchange information and files and for calendaring. One of the work groups in the data center compiles and updates electronic work sheets, detailing such information as the number

of calls to the company's Help desks, manpower requirements, potential bottlenecks and information related to key projects that are in the works.

"LANs are definitely changing the group dynamics," said Pat Berastegui, senior office automation analyst at Ryder.

The changing dynamics also pose new challenges for information systems managers, however. With more of their end users on networks, IS managers must contend with designing and building network architectures that can support work groups of different sizes and with diverse objectives.

MIS will also cope with determining who owns and controls the data, meeting the increased demands of training users to properly use networks and evaluating software that was designed to support cooperative work, according to researchers.

Ideally, groupware should be designed to match the stability

*Continued on page 38*

## Baxter gets PC smart, ousts dumb terminals

BY ELLIS BOOKER  
CW STAFF

DEERFIELD, Ill. — Baxter Healthcare Corp. is filling a new prescription for the terminals used by its hospital customers. The medical products supplier based here is working out the details of a plan to replace the 3,000 teletypewriter terminals on its nationwide Analytic Systems Automated Purchasing

(ASAP) order-entry system with MS-DOS-based personal computers.

"We want to support our customers and give them added functionality. This becomes increasingly difficult to do with nonintelligent terminals," said Ergin Uskup, vice-president of business technology at Baxter.

Among other uses, the PCs could enable customized order-entry menus or powerful cross-

reference capabilities for the 120,000 health care products and services contained in the ASAP database, Uskup said.

#### Decision pending

Although Baxter has not yet decided on a particular brand of PCs to replace the dumb terminals, it hopes to start the conversion this year and complete the project in 1990. Uskup said Baxter may provide two or three types of PCs to hospitals, depending on the application.

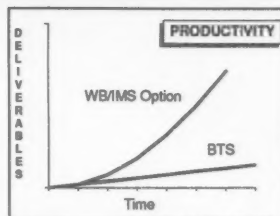
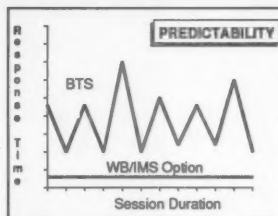
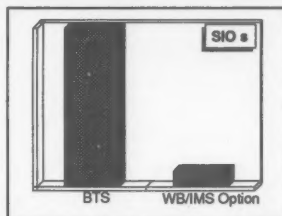
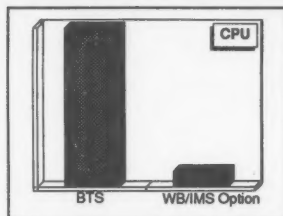
Baxter already has some experience with PCs on ASAP. Last August, it began beta-testing ASAP Express, a PC-based applications and communica-

tions package. Implemented on Intel Corp. 80286-based PCs, ASAP Express is now operational in 400 locations and will be released nationally July 1, according to Baxter.

The old ASAP system — developed in the 1970s and often cited as a prime example of the strategic use of information technology — was the innovation of American Hospital Supply Corp., which merged with Baxter in late 1985.

Baxter, with \$7 billion in annual revenue last year, dominates the health care supply market and said its terminals can be found in 60% of the 6,000 to 7,000 hospitals in the U.S.

## Technology Breakthrough: IMS DB/DC on a PC!



**Micro Focus COBOL/2 Workbench™ with the IMS Option: IMS and MORE on a PC Workstation!**

- Relieves the Mainframe of TSO/BTS/SPF Burden
- Visual Source Code Debugging
- ANIMATE your code and watch it run. Unique and powerful!
- Programmer can control execution path and data content.

- Immediate System Regeneration
  - DBD, PSB, MFS, ACB Gens done in seconds!
  - Offload IMSVS, CICSVS, CICS-DLI, COBOL, SPF, DB2
- Consistent subsecond response time

- Installed in major Fortune 1000 Data Centers worldwide!

For the most efficient development of your mainframe IMS DB/DC applications, call us now.

**1-800-872-6265**

US: 2465 E. Bayshore Road  
Palo Alto, CA 94303  
(415) 856-4161

**MICRO FOCUS®**  
*A Better Way of Programming™*



Imagine



# a major highway with only two lanes.

## Now you know why you need Micro Channel from IBM.

Picture it.

Rush hour traffic. Two narrow lanes. All backed up and no place to go.

If you're lucky, this isn't the situation you face on the road every day. But it does describe what's going on inside most personal computers.

That's why IBM developed the Personal System/2® with Micro Channel.™ Micro Channel gives the PS/2® more "lanes" to handle the flow of information. Within your system. And between systems. It's a veritable superhighway. With an impressive combination of speed and reliability that leaves ordinary computers far behind.

Best of all, the IBM Micro Channel delivers data faster and makes the most of your expansion card performance, all with improved reliability. And when you're ready

to add new cards, including the latest "intelligent" ones, Micro Channel gives you an easy, switchless way to do it. More proof that when you're thinking ahead, you're thinking IBM.

Ask your IBM Authorized Dealer or IBM marketing representative about the IBM Personal System/2 with Micro Channel. For a dealer near you, call 1 800 IBM-2468, ext. 121.

Just make sure you fasten your seat belt.

# IBM



See IBM's Micro Channel and OS/2™ in action at Chicago COMDEX. April 10-13. Booth 1214.

IBM, Personal System/2 and PS/2 are registered trademarks of International Business Machines Corporation. Micro Channel and OS/2 are trademarks of International Business Machines Corporation. © 1989 IBM Corp.

# FACE THE FACTS

## A Comparison Chart of the Major Cooperative Processing Software Products:

Functions:	SUPER-LINK® Family	Enter/3270®	IBM's HILAP™	IBM's APPC™ or CPI-CTM	SQL*Star®	Arbiter®	Automator™
Cooperative Processing Topologies Supported							
Server/Requester	YES	NO	YES	NO	NO	NO	NO
PC-based Front-end To Existing Programs	YES	YES	YES	NO	NO	NO	YES
SAA/CUA Front-end Created Without Host Code Changes	YES	NO	YES	NO	NO	NO	NO
Peer-To-Peer Communications	YES	NO	NO	YES	NO	YES	NO
Distributed Database	NO	NO	NO	NO	YES	NO	NO
PC Developer's Toolkit							
4GL Language	YES	YES	NO	NO	YES	NO	NO
DBMS	YES	NO	NO	NO	YES	NO	NO
Screen Capture Facility	YES	YES	NO	NO	NO	NO	NO
Forms Generator / Screen Painter	YES	NO	NO	NO	YES	NO	NO
Can Call 3GL Subroutines	YES	YES	NO	NO	YES	NO	NO
Scripting Facility	YES	Partial	NO	NO	NO	NO	YES
Virtual Operator Mode	YES	YES	NO	NO	NO	NO	NO
Local Mainframe Communications Simulator	YES	NO	NO	NO	NO	NO	NO
Debugger	YES	NO	NO	NO	YES	NO	NO
Form Testing & Debugging System	YES	YES	NO	NO	YES	NO	NO
Host-based Transaction Simulator	YES	NO	NO	NO	NO	NO	NO
Automatic COPY LIB Generation	YES	NO	NO	NO	NO	NO	NO
Micro-based Table Generation Utility	YES	NO	NO	NO	YES	NO	NO
Automatic Generation of PC-level Documentation	YES	NO	NO	NO	NO	NO	NO
File Transfer Support							
ASCII/EBCDIC Conversion Of Data	YES	NO	NO	YES	NO	YES	NO
Transfer Of Binary Files & Text Files	YES	NO	NO	NO	NO	YES	NO
Transfer Under Host Or PC Program Control	YES	NO	NO	YES	NO	YES	NO
Full SDLC Error Detection/Correction For Asynch Links	YES	NO	NO	NO	NO	YES	NO
Front-End Processing Support							
SAA / CUA Fully Supported	YES	NO	NO	NO	NO	NO	NO
Optional Host Screen Pass Through	YES	YES	NO	NO	NO	NO	YES
Dynamic Control of Field Attributes	YES	YES	NO	NO	NO	NO	YES
PC FORMS of Up To Four Pages	YES	NO	NO	NO	NO	NO	NO
Field-level, Context-sensitive Help Facilities	YES	NO	NO	NO	NO	NO	NO
Automatically Non-Intrusive Help	YES	NO	NO	NO	NO	NO	NO
Optional Learning Mode Automatically Displays Help	YES	NO	NO	NO	NO	NO	NO
Icon-based Menus	YES	NO	NO	NO	NO	NO	NO
Light-bar Menu Selection	YES	YES	NO	NO	NO	NO	NO
Dynamic & Programmatic Cursor Control	YES	YES	NO	NO	NO	NO	NO
Softkey Labels	YES	NO	NO	NO	NO	NO	NO
Text Windows	YES	NO	NO	NO	NO	NO	NO
Peer-to-Peer Processing Support							
Data Compression	YES	NO	NO	NO	NO	YES	NO
Call-level interface between host and PC programs	YES	NO	NO	NO	NO	NO	NO
All Host Databases Supported	YES	NO	NO	YES	NO	YES	NO
All Host Applications Supported	YES	NO	NO	NO	NO	NO	NO
PC Developer's Toolkit Included	YES	NO	NO	NO	YES	NO	NO
Software Distribution Support							
Programmatic Interface	YES	NO	NO	NO	NO	NO	NO
Time/Date or Checksum Host Query	YES	NO	NO	NO	NO	NO	NO
Background Communications Support							
Simultaneous Background/Foreground Processing	YES	NO	NO	NO	NO	NO	NO
Control of Communications From Foreground Program	YES	NO	NO	NO	NO	NO	NO
Communications Protocols Supported							
LU2 Support	YES	YES	YES	NO	YES	YES	NO
LU6.2 Support	Planned	Planned	NO	YES	Planned	YES	NO
Application Portability							
Front-End Processing to Peer-To-Peer	YES	NO	NO	NO	NO	NO	NO
DOS To OS/2	Planned	Planned	Planned	NO	YES	Planned	Planned
LU2 To LU6.2	Planned	Planned	NO	NO	Planned	YES	NO
Host Environments Supported							
IBM TP Monitors Supported							
CICS	YES	NO	NO	YES	YES	YES	NO
IDMS/DC	YES	NO	NO	NO	NO	NO	NO
IBM Interactive Systems Supported							
VM/CMS	YES	NO	NO	NO	YES	NO	NO
MVS/TSO	YES	NO	NO	NO	YES	NO	NO
DEC VAX Supported	YES	NO	NO	NO	YES	NO	NO
Minimum PC Hardware Requirements							
IBM XT or Equivalent With 640k	YES	YES	YES	YES	NO	YES	YES

Every effort to present an accurate chart has been made, however no guarantee can be made. Enter/3270® is a registered trademark of Aspen Research. Automator™ is a trademark of Direct Technology. Arbiter® is a registered trademark of Tangram Systems. SQL\*Star® is a registered trademark of Oracle Corporation.

## MULTI SOFT'S SUPER-LINK®

Family gives you SAA/CUA  
now, without mainframe  
coding!

INFRONT/DS™ (Development System) is a complete, PC-resident developer's toolkit, including: an intelligent screen management subsystem; a 4GL, with a source code debugger; and a PC-resident data base, with a series of data base maintenance utilities. INFRONT/DS™ allows a developer to add new functions and a PC-resident SAA/CUA-compatible front-end to existing HOST applications without changing any mainframe code.

INFRONT/RT™ (Run-time) is the run-time software that allows INFRONT/DS™ applications to run 'in front' of standard, 3270-based mainframe applications. With INFRONT/RT™ data is exchanged between the PC and mainframe by using the 327X screen image as the communications medium. INFRONT/RT™ supports a wide variety of 327X emulation interfaces including the IBM API's (HLLAPI and low level API), IRMA cards, and LAN gateways which account for over 90% of the installed base of 327X emulation cards and software.

INFRONT/HPO™ (Host Processing Option) extends INFRONT/RT™ into the development of peer-to-peer cooperative processing applications. INFRONT/HPO™ provides the cooperative processing capabilities of IBM's APPC (Advanced Program-to-Program Communications) product for PC/host applications. However, instead of requiring the use of LU6.2 SNA sessions, INFRONT/HPO™ executes over the LU2-based networks that are already in place. INFRONT/HPO™ uses INFRONT/DS™ to create PC forms. This allows all INFRONT™ form to be completely portable between the screen-based communications of INFRONT/RT™ and the peer-to-peer protocols of INFRONT/HPO™.

SDF™ (Software Distribution Facility) is an INFRONT/HPO™ application that brings the distribution of PC software and files under the programmatic control of the host, and provides a mechanism for ensuring that all users of standalone and cooperative processing applications are using the correct versions of all programs, forms, files, and tables.

INFRONT/BCF™ (Background Communication Facility) provides an API (application program interface) for PC programs that allows them to communicate with an IBM host on a file-by-file or record-at-a-time basis. Communications between the host and PC can take place on a real-time basis, or in a background mode where the communications process can execute as a background task managed by INFRONT/BCF™. This background task is implemented in a standard MS/DOS environment and allows any DOS program to run in the foreground. The foreground and background tasks can be completely unrelated.

Call Now!  
800-888-4973

Multi Soft, Inc. (S1)

123 Franklin Corner Rd.  
Lawrenceville, NJ 08648

609-896-4100

Fax # 609-895-0072

Telex # 821073





SMALL  
TALK

Michael Alexander

LANs and  
white collars  
a good mix

Corporate America is snapping up LAN servers, gateways, software and other local-area network products faster than an arcade video game swallows quarters, according to market researchers. A recent study by Business Communications Co., a Norwalk, Conn., research firm, indicates that annual sales of all LAN products will grow from some \$2.7 billion in 1988 to more than \$10 billion in 1996.

The combination of improved LAN technology and falling costs is certainly responsible for LAN popularity. But the sales rush may have more to do with corporate America's desire to boost white-collar productivity than with favorable price/performance ratios. The fact is, the nation's white-collar workers have not been as productive as blue-collar workers even though companies have spent tens of billions of dollars on information systems, ostensibly to boost productivity.

In a bid to hike productivity and competitiveness, many U.S. companies have been thinning their ranks of middle managers. Some researchers calculate that organizations have pared more than one million managers in the past 10 years. At the same time, U.S. companies are increasing middle managers' span of control, giving them more employees to supervise

Continued on page 42

Wingz gets its crack  
at dethroning Excel

## ANALYSIS

BY JULIE PITTA  
CW STAFF

The first shipments of Informix Software, Inc.'s spreadsheet Wingz have just reached Apple Computer, Inc. Macintosh users, who eagerly await its razzle-dazzle capabilities. But attractive features such as three-dimensional graphics may not be enough to challenge the installed base of Microsoft Corp.'s Excel, the leader in the Mac spreadsheet market.

"Wingz is an impressive package," said Jack Baumann, manager of end-user computing services at Hughes Aircraft Co., which has standardized on Excel. "But once you have an installed base of software, it's hard to switch to something else."

Before the Macintosh could be taken seriously by corporate users, upstart Apple had to woo software developers to create business applications for it. Because it was the first to create a spreadsheet for the Mac, Microsoft has established what appears to be an unconquerable

lead, particularly with Excel's installed base in major companies.

Today, others have followed suit. Users say Mac spreadsheet packages offer features comparable to those for MS-DOS-based PCs.

"The spreadsheets on the Mac side and the DOS side are pretty equal now in terms of what they do," said Bo Pitzker, systems analyst at Pacific Bell Directory's information services group in San Francisco. "However, there are more specialized spreadsheets available on DOS that you can't get on the Mac."

Excel for the Mac boasts an almost 80% share in a market in which 142,000 spreadsheets were sold for the Mac in 1988, according to Infocorp, a Cupertino, Calif., research firm. A distant second is Multiplan, also a Microsoft product. Ashton-Tate Co. is also in the market with its Full Impact.

"It's nice to have a single product that works in both the MS-DOS and Mac environments," Baumann said. Excel is available in both a Mac and an MS-DOS version.

Excel is also the standard

spreadsheet at Seafirst Corp., the Seattle subsidiary of BankAmerica Corp. "We've looked at the other packages, but I don't think we'll actively entertain the idea of switching from Excel," said Jim Hayes, a PC support specialist at Seafirst. "It seems to suit most people's needs."

## Not all are pleased

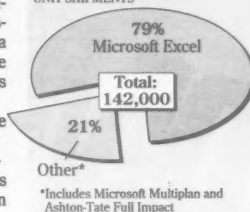
Not all Excel users are as pleased. Pitzker said Excel's peculiarity of using the first megabyte of the Mac's memory has created problems for some users. For example, users must access Excel before moving into Multifinder, the multitasking version of the Mac's operating system, or else memory glitches occur, he maintained.

"We have people here build-

## Little left for others

Excel has scooped up most of the Macintosh spreadsheet market

1988 MARKET SHARE BY  
UNIT SHIPMENTS



\*Includes Microsoft Multiplan and Ashton-Tate Full Impact

SOURCE: INFOCORP  
CW CHART: JOHN YORK

ing some pretty robust spreadsheets," Pitzker said. "If Microsoft doesn't alter this, there might be some defections."

Wingz, which began shipping in February after a delay of several months, has even impressed users committed to Excel. What they like is the product's ability to build spreadsheets and then create a polished presentation interspersing graphics and text. Also, Wingz allows users to create three-dimensional graphics.

"Wingz is a different kind of animal," Hayes said. "The output is a lot nicer than Excel's." Excel users must cut and paste text and graphics to generate the kind of presentations created by Wingz. It usually requires using a presentation package in addition to Excel.

The drawback is that Wingz requires a significant amount of memory. "It requires 1M byte of RAM, but it runs better with 2M bytes," Hayes noted.

Ashton-Tate's Full Impact appears to have gained little ground against Excel since its introduction last year. According to Infocorp, its market share is significantly less than 10%. Users don't seem to be holding their breath for Lotus Development Corp. to introduce 1-2-3 for the Mac, which Lotus officials have discussed without mentioning delivery dates. Lotus' only Mac product, Jazz, proved to be a dismal failure.

## Compaq slims down with Deskpro

BY WILLIAM BRANDEL  
CW STAFF

HOUSTON — Compaq Computer Corp. is hoping that personal computer users will think less is more in marketing its Deskpro 286E line.

Compaq, a leader in Intel Corp. 80386-based PC sales, is signaling to the market that 80286-based systems are still vigorous enough for users as it squeezes them into a smaller than usual box. The 286E unit

measures 5.9 by 14.8 by 15.8 in. — 100 square inches less than Compaq's Deskpro 286.

The models' pricing is lower than the Deskpro 286, which ranges from \$2,699 to \$4,199. The Deskpro also includes only 640K bytes of memory, while the 286E has 1M byte. The 286E systems' list prices range from \$2,699 to \$3,599.

All three Deskpro 286E models use an 80286 processor with a 12-MHz clock speed and 1M byte of memory. The systems

also include four 8- and 16-bit expansion slots and one high-speed memory expansion slot.

For the same price, however, users can purchase comparably equipped machines implementing the more robust Intel 80386SX technology, according to Bruce Stephen, senior PC analyst at International Data Corp., a market research firm in Framingham, Mass. Stephen said he believes the Compaq machines are targeting IBM's Personal System/2 Model 50Z in the

coveted retail channels.

The entry-level Compaq 286E Model 1 has a 5¼-in. 1.2M-byte disk drive and sells for \$2,699. The 286E Model 20 has a 20M-byte fixed disk drive in addition to the 1.2M-byte drive. It is priced at \$3,399, according to Compaq.

The 286E Model 40 also includes a 40M-byte fixed disk drive. It costs \$3,999. Both of the models offer a disk access time below 29 msec, Compaq claimed. All products run MS-DOS 3.31 and 4.01 in addition to Microsoft Corp.'s OS/2 Version 1.1.

Amstrad wraps service  
with 286 and 386 PCsBY SALLY CUSACK  
CW STAFF

IRVING, Texas — Amstrad, Inc. recently stepped up its efforts in the IBM Personal Computer arena by packaging a free one-year on-site service policy with its latest PC-compatible systems for the U.S. market.

Amstrad announced the service policy when it introduced the Amstrad PC 2286 and PC 2386, which are based on the Intel Corp. 80286 and 80386

chips. The 21-year-old British company, with a subsidiary based here, has been active in the U.S. for three years. Until now, that U.S. activity had been restricted to PC XT-compatible machines.

The 12-MHz PC 2286 offers 1M byte of random-access memory, expandable to 4M bytes on the motherboard, and a choice of IBM Video Graphics Array (VGA)-compatible monitors. The unit is available with twin 1.4M-byte 3½-in. disk drives or

a 40M-byte hard disk with a single floppy drive, the vendor said. It is compatible with Novell, Inc.'s Netware and OS/2 and comes with an Intel 80287 math coprocessor socket.

## Flagship

Billed as the flagship of Amstrad's PC 2000 series, the PC 2386 20-MHz machine is aimed at the high-end workstation user. The VGA-compatible system reportedly includes 64K bytes of RAM cache memory and asynchronous expansion bus operations. It is shipped with MS-DOS 4.0 and Microsoft Corp.'s Windows 386 and can also be used with OS/2. RAM is reported to be expandable to 16M bytes on the motherboard,

and virtual memory operation allows applications to use hard-disk storage as RAM.

"We're not a rebranded product or an OEM supplier, and that sets us apart from the competition," said Vernon Moore, Amstrad's chief executive officer. "We design our own chip sets; our custom BIOS was written in 1986. With profits over a quarter billion net before taxes last year, we also are providing our dealers with a financially stable company. We will be here 10 years from now."

"No new companies have been introduced to the U.S. market in the past two years," said Fred Helms, vice-president of sales. "We don't expect to compete with IBM and Compaq for

the No. 1 and No. 2 slots. We do, however, expect to be ranked as the No. 3 or No. 4 player. To our knowledge, we are the only company to offer a complete package out of the box."

The PC 2286 costs between \$2,000 and \$3,000. The PC 2386 will cost \$6,000 for a standard configuration, which includes 4M bytes of memory and a 65M-byte hard drive. Both units include security locks for network use and are scheduled to ship early this summer.

Helms said the PCs will be distributed exclusively through the firm's Advanced Systems Division to specialty dealers serving corporate end users and to value-added resellers targeting specialty applications.

## Barney

FROM PAGE 33

Of course, the PC vendor panelists huffily disagreed, and with that point dispensed with, the self-serving discussions continued.

But the users weren't finished. Later that day, another MISer got fed up and took to

the microphone. This gentleman accused the vendors of making decisions based purely on business motives, with little or no regard for customers' interest. Again, the point was shunted aside and the banter continued.

The words echoed in my brain for days afterward. The small contingent of MIS managers at an otherwise vendor-ruled conference was not to be

drowned out, no matter how much hype and mud got slung. They made their points quickly and with a dose of eloquence, and in the process, they were as refreshing as the California sunshine to which irked MISers finally fled.

**File format hell.** The idea germinated when Lotus officials called 1-2-3 Release 3.0 "un-

clonable" because of the new file format aimed at handling three-dimensional worksheets. They said this like it was a good thing. Little do they realize that this "unclonability" is as much a problem for Lotus as it is for Lotus competitors. It is an even worse problem for users who have already spent years getting hot under the collar because "file format hell" makes data

exchange a bother.

It's good to see the vendors get bitten by the same bug. You see, Lotus has this nifty new product called Magellan that allows people to search for information using keywords (even misspelled ones), locate the file and launch directly into the application that created it.

It's great, except for one problem. Magellan has to under-

**M**AYBE IT was because I was inside smelling smoke and bodies instead of clean desert air, or maybe it was the tone of the panels. In either case, I was ticked off.

stand an application's format in order to allow proper file viewing. Microsoft says that its Windows products will drive Magellan crazy, an argument to which Lotus concedes. But Microsoft character-mode programs such as the unshipped Word 5.0 will also give the Lotus utility fits, says Mike Maples, Microsoft applications chief.

Lotus has a number of solutions, none of which are perfect. One is to write new viewers themselves and another is to convince application vendors to make their software Magellan-compatible. But if Lotus is protective of the Release 3.0 format, why should vendors belly up to Magellan? And how will the nearly constant stream of Magellan updates be distributed?

Barney is a *Computerworld* senior editor, PCs & workstations.

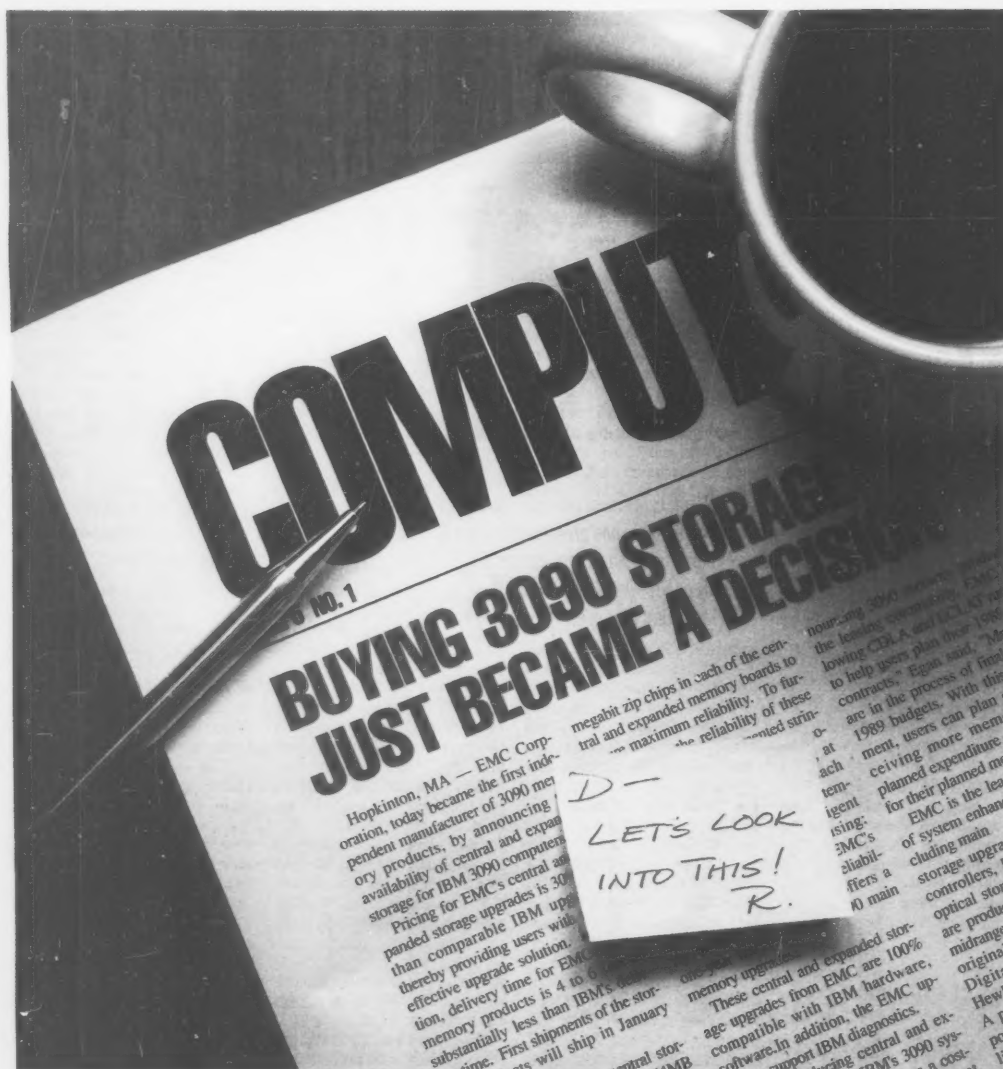
## Groupware

FROM PAGE 33

and regularity that underlies any organized work activity while also harnessing the power of LANs at the same time, said Roger Moody, chief executive officer at Coordination Technology, Inc. in Trumbull, Conn. The firm plans to launch a groupware product in about a year.

"Look at the LAN platform; it's rigid, precise and formal," he said. "Now look at white-collar work; it's flexible, imprecise and casual." The challenge is developing software that is harmonious with both aspects, he said.

A larger problem for groupware users is that there are few industry standards. Although groupware designed for LANs can run on most of the industry-standard networks such as IBM's PC LAN and Novell, Inc.'s Netware, many of the components such as E-mail and calendaring are proprietary.



## Announcing 3090 Central and Expanded Storage from EMC Corporation.

As a 3090 user you now have the choice to make a smart business decision. Our 3090 Central and Expanded Storage upgrades offer you the reliability, performance, local and remote support that you demand at a price 30% lower than that of IBM.

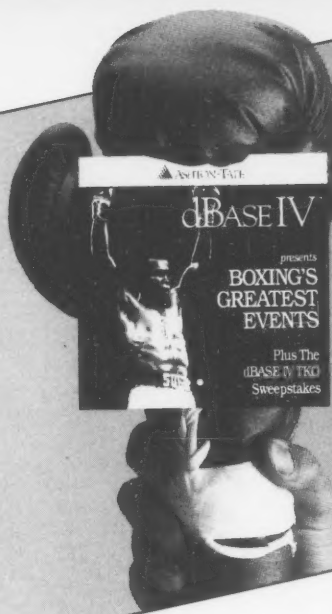
Actually, this good news is old news. For 10 years we have been offering users cost-effective, state-of-the-art storage solutions. Our

strong background in mainframe storage solutions has been recognized by Fortune 500 companies worldwide. These companies have realized that we provide a better business decision for their mainframe storage needs. Now, we have built this mainframe experience into our 3090 product offerings.

For additional good news on how EMC Corporation's 3090 storage upgrades can help

you reach your business objectives call or write: EMC Corporation, Hopkinton, MA 01748-9103 1-800-222-EMC2. (In MA, 508-435-1000.)

**EMC<sup>2</sup> The System Enhancement Company.**  
IBM is a registered trademark of International Business Machines Corporation.



**Win two ringside tickets to the Leonard/Hearns fight or a TKO Compaq DESKPRO 386/25 PC system! Instantly!**

Just go to your participating Ashton-Tate® dealer to enter the dBASE IV™ TKO Sweepstakes. View the dBASE IV TKO Sweepstakes Demo Disk to see if you're an instant TKO Grand Prize winner. At the end of the demo, you'll also get an entry form that you can mail in for a second shot at the TKO Grand Prize or other fabulous prizes.

**5 Grand Prizes:** An exclusive VIP weekend package trip for two to Las Vegas, including ringside seats to the Leonard/Hearns fight on June 12, 1989 or a TKO Compaq DESKPRO 386/25 PC system with 4 megabytes of internal memory, 60 megabyte hard disk, VGA graphics board and

monitor, and a 2400-baud modem.

**There are lots of other exciting prizes.**

**50 First Prizes:** Compaq SLT Portable Laptop PCs (Model 20).

**100 Second Prizes:** Hard-to-get, easy-to-wear Ashton-Tate dBASE IV TKO jackets.

**500 Third Prizes:** Free pay-per-view certificates to watch the Leonard/Hearns fight on cable TV.

**Early Bird Prize:** Two trips for two to either Sugar Ray Leonard's or Tommy Hearns' training camp prior to the fight.

# Winner by Technical Knockout.

"It has the most impressive list of features in the database environment."  
—DataBased Advisor

"dBASE IV has emerged hardy, healthy and equal to the task of proving itself to the skeptical."  
—The New York Times

"If you program in dBASE III PLUS, an upgrade to dBASE IV is irresistible."  
—InfoWorld

"dBASE IV offers the most powerful tools for both non-programmers and programmers, and is much easier to use than its competitors...  
It achieved the only four star rating."  
—Software Digest

"It will dominate the MS-DOS and OS/2 database market during the next two years."  
—Computer Currents

"Ashton-Tate has done a terrific job with dBASE IV."  
—DBMS

"It represents a quantum leap over dBASE III PLUS™ in functionality, power, and ease of use."  
—BYTE Magazine



Since its introduction last October, dBASE IV™ has sold over 300,000 copies. In fact, it's one of the fastest-selling new software products in history.

Even faster than Lotus 1-2-3.

And the applause is growing.

From InfoWorld's readers, who named dBASE IV the MS-DOS Database Product of the Year.

From new users, who are finding that dBASE IV's intuitive new Control Center offers a fast and easy way to utilize all its power.

From seasoned users of dBASE III PLUS™ who appreciate the more than 310 new or enhanced commands and functions.

From developers and third-party programmers, who are finding in dBASE IV's Developer's Edition all they need to go from inspiration to application.

And from industry heavyweights, who are hailing dBASE IV as the new world champion in database management.

**See what all the cheering is about.**

Give us a ring at 800-437-4329 ext. 291. We'll give you more information, including details about upgrading from dBASE III PLUS.

Or simply stop by your nearest Ashton-Tate dealer and see dBASE IV up close. It'll knock you out.

© 1989 Ashton-Tate Corporation. Trademark/Owner: dBASE III PLUS, dBASE IV, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corporation. Other product names used herein are for identification purposes only and may be trademarks of their respective companies. Sweepstakes offer void where prohibited. Instant win demo disks available while supplies last. No obligation, no purchase necessary. In the event of a demo disk instant winner, the original TKO Demo Disk must be mailed to FCB/Impact with the completed Instant Win Entry Form to claim the prize. Offer ends 5/31/89. Open to residents of U.S. and Canada (except province of Quebec), age 18 or over. See official rules at your Ashton-Tate dealer for details.

 **ASHTON-TATE®**





Dan Goulet,  
Ph.D., Director,  
Academic Computing Services,  
University of Wisconsin-Stevens Point.

Jim Leonhart,  
AT&T National Account Manager.



Recently, an information management revolution occurred at the University of Wisconsin-Stevens Point. Dan Goulet from the University and Jim Leonhart of AT&T—campus radicals of a different kind—explain how they were able to realize a bold and complex vision.

FEBRUARY 22, 1989

**Jim:** I remember the first day we met. You had been around the block a few times, but weren't getting the answers you needed.

**Dan:** We wanted to create a unique education environment: a free-flowing on-line computer campus. We had a vision, and we were looking for someone to help build it.

**Jim:** A distributed networked computing solution, that's what we'd call it now: a way to process, move and manage information effectively, throughout a widespread organization.

**Dan:** We talked to many computer vendors before you. We got tired of describing what we needed, so we drew it. That graphic was about 13 feet long.

**Jim:** More like twenty. The chart showed every information resource on campus linked together, accessible to students, faculty, and administration. It became the wallpaper in my office for fifteen months.

**Dan:** It was like a blueprint for a data superhighway.

**Jim:** We put our ISN wide-area network at the center—like an interchange—and built fiber and twisted-pair data lanes to applications running

on AT&T 3B2s, DEC, UNISYS and other hosts located in all the departments. We put on- and off-ramps in strategic locations: StarLAN networks that gave access to the highway from workstations.

**Dan:** We designed everything from the user perspective. The more technically remarkable the system became, the harder we worked to make it approachable.

## These men started a revolution on campus.

**Jim:** Easy for novices, powerful enough for programming students.

**Dan:** We developed a menu-driven user interface that is consistent and clear. Students and faculty can select applications like checking spelling, transmitting course grades, even browsing through the on-line card catalog of 1.5 million books at the University of Wisconsin-Madison. We wanted desktop power and access, but we wanted to process information where it made the most sense.

**Jim:** Thinking back, we realized early that the complexity of your vision precluded a single-system focus. You needed open systems.

**Dan:** You were really the only ones that understood this point. Open systems allow us to use off-the-shelf components; vendors have to bid against each other to get our business. Open systems are the secret.

**Jim:** It's mind-boggling how much computer power is out there. We wanted to harness it all, yet give a piece to every individual.

**Dan:** A truly distributed network, one we don't think we'll ever outgrow. We've added 300 WGS workstations in the last five months.

**Jim:** Dan, where in the world is that wallpaper today?

**Dan:** We had it bronzed. Today, so many colleges and businesses really need a similar solution. That's probably why we've had so many visits from them lately.

**Jim:** Little did we know back then, when we first met.

**Dan:** Oh, something tells me you had a hint.

### The Stevens Point Solution:

#### THE CHALLENGE:

Create a distributed computing revolution; link the campus into an integrated information resource open to every user.

#### THE SOLUTION:

AT&T 3B2 computers support a multitude of UNIX® System V-based applications. AT&T StarLAN connects AT&T WGS computers, a variety of micros, and hosts together. The AT&T Information Systems Network (ISN) is every campus user's gateway to all computer resources.

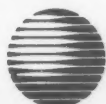
#### THE RESULT:

Stevens Point has been designated a Center of Excellence for Distributed Academic Computing by the Board of Regents for the entire University of Wisconsin system. The majority of the 9000 students on campus regularly use the network for coursework and homework. Faculty have integrated computing into 41% of their coursework.

Call your AT&T Account Executive, an AT&T Authorized Reseller, or 1 800 247-1212, Ext. 156.

DEC is a registered trademark of Digital Equipment Corp. UNIX is a registered trademark of AT&T in the U.S. and other countries. ©1989 AT&T

*your computing systems and networking solutions company*



**AT&T**

The right choice.

## Alexander

CONTINUED FROM PAGE 37

and greater decision-making responsibilities. Researchers say the PC network is the "nervous system of enabling technology" that allows a company to do business with fewer levels of managers and still boost productivity.

Harvard Business School Professor Lynda Applegate says information technology will dramatically shape the way management will take care of business in the future: Tomorrow's managers will be able to make their organizations more responsive not only to the needs of their employees but also to the demands of their customers.

Applegate and two colleagues have been researching the use of decision-support systems to understand information technology's impact on planning. She envisions managers convening in "automated meeting rooms" that will be used for sharing information verbally and electronically on a local-area network.

"The senior managers listen to different people present their data and then each manager rates it according to criteria that the managers have developed," she explains. "We have not been able to use technology to mediate face-to-face human communication, and there are many, many potential difficulties using it at the wrong time with the wrong kind of group. We don't have a good understanding yet of how these groups work."

"During the idea-generation phase, it helps to have executives on-line individually and then face-to-face when consensus is wanted," she says.

Technology-based communication helps to facilitate the early stages of a project because it allows executives a certain anonymity to express ideas without fear of criticism or other potential knocks to the ego.

Also, many decisions take longer to make without face-to-face communication. Executives may be more willing to moderate their stance on an issue when they can visually gauge reactions and attitudes of colleagues, she says.

Alexander is a *Computerworld* senior editor, PCs & workstations.



© BOOTH '89

"Sir, some of the exhibitors would like to talk to you about the rental equipment."

## LEASAMETRIC

Data Communications

Unlike some companies, Leasametric can handle every detail of hardware rental for your special event. Whether it's a trade show, training program or product intro, we're with you from delivery to installation to teardown. And Leasametric has the largest selection of PCs, peripherals, and network products in the industry. Call us.

Northwest: (800) 343-7368, (415) 574-5797 • Southwest: (800) 638-7854, (818) 708-2669 • Central: (800) 323-4823, (312) 595-2700  
Northeast: (800) 221-0246, (201) 825-9000 • Southeast: (800) 241-5841, (404) 925-7980

© Leasametric, Inc. 1989

## NEW PRODUCTS

### Systems

Wyse Technology has added two high-end personal computers to its line of Intel Corp. 80286- and 80386-based IBM Personal Computer AT-compatible systems.

The 25-MHz Wyse 386 Model 3225 was designed for engineering workstation, multiuser and network-server applications, the vendor said. It features zero-wait state and uses a 32-bit memory bus. It reportedly comes configured with 4M bytes of single LU line memory module memory and 64K bytes cache memory. The machine is available in three configurations, with pricing ranging from \$8,599 to \$12,699.

The Wyse 286 Model 2116 was reportedly developed for both individual workstations and entry-level multiuser applications. The 16-MHz unit offers one-wait state memory and five expansion slots. Also available in three configurations, the system is priced from \$2,899 to \$3,599.

Wyse Technology  
3571 N. First St.  
San Jose, Calif. 95134  
408-433-1000

### Peripherals

A palm-sized, portable bar-code reader has been introduced by Videx, Inc.

The Timewand II includes an RS-232 serial port and 19 buttons with user-definable keys for inventory control, asset tracking, quality control and other applications, the vendor said. Reported to measure 4.1 by 2.6 by 0.6 in. and weighing in at six ounces, the unit is priced at \$698.

Videx  
1105 N.E. Circle Blvd.  
Corvallis, Ore. 97330  
503-758-0521



Videx's palm-sized bar-code reader

AOC International U.S.A. Ltd. has announced the 300 series of color personal computer monitors.

The 14-in. color-monitor product line includes the CGA-311, the EGA-312, the VGA-313 and the Multisync-314. All are IBM Personal Computer-compatible, and each features a tilt-swivel base and non-glare screen. Pricing ranges from \$399.95 to \$799.95.

AOC International  
10991 N.W. Airworld Drive  
Kansas City, Mo. 64153  
800-443-7516



# The World's Most Successful Software Companies Are Sold On Software Management.

Compuware, Legent, Management Science America, Policy Management Systems and Systems Center are five of the most successful and respected names in the software industry. Together, their customer bases include almost every IBM site around the world—representing over 40,000 installed mainframe products.

These companies have all taken yet another step to provide their customers with the highest quality software. They are implementing the industry's only automated software management system—ENDEVOR.®

Using ENDEVOR, these vendors are able to manage software development and distribution within a unified environment. ENDEVOR automatically tracks every component of a software system from the time it's designed through testing and release. The results—shorter development cycles, fully reliable systems, on-time delivery to users and a more sophisticated approach to customer support.

Now you can bring all the benefits of the ENDEVOR Software Management System to your organization. With ENDEVOR, you can manage the creation, evolution, distribution and operation of your vendor-supplied and internally developed software—automatically. Whether it's traditional, 4GL, CASE or DBMS based.

The ENDEVOR Software Management System provides:

- Inventory and library management for classifying and tracking software components
- Change control that produces audit trails, source-to-executable links, and ensures standards enforcement
- Configuration management that automatically captures application interdependencies for point-in-time recreation and change impact analysis
- Release management that automatically controls the distribution of applications from test to production and to remote sites

If you're concerned about automating the management of your organization's application systems and are interested in improving the quality of production turnovers, software distribution, vendor application updates, software documentation, application stability, change implementation or change impact analysis, follow these software industry leaders.

Call us at (508) 870-1900 and ask us how ENDEVOR has already worked wonders at over 200 top installations like yours, and at the top software firms in the world.



The Software Management Experts

Business Software Technology, Inc., Westboro Executive Park, 114 Turnpike Road, Westborough, MA 01581-9990  
ENDEVOR is a registered trademark of Business Software Technology, Inc.





Most networks refer to you as if you were made up of chips and circuits instead of flesh and blood.

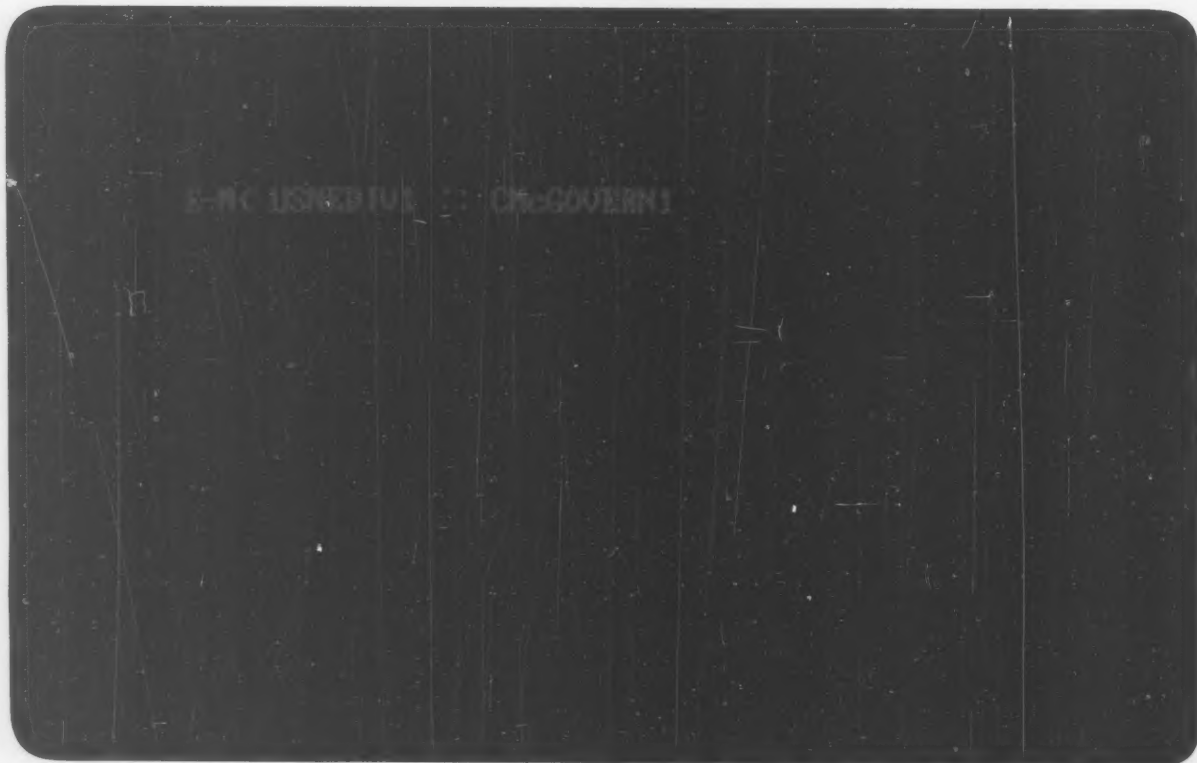
But at Banyan, we respect the name you were born with. So instead of trying to make your name fit our system, we created a system that fits your name. It's called StreetTalk.™ A simple but powerful naming system that makes it possible to reach anyone, anywhere on the network simply by knowing their name.

No matter how far away they are. No matter how many servers are in between.

And when people change departments or departments change servers, our VINES™ network operating system will know exactly where to find them.

To find out more, call 1-800-828-2404 or write to Banyan Systems, 115 Flanders Road, Westboro, MA 01581. When you see what we can do, you may feel like uttering a few harsh names yourself. Toward your old network.

# Some guy from Cincinnati is calling you harsh, unnatural names.



Networks for those who think big. **BANYAN**

# NETWORKING

## DATA STREAM

Elisabeth Horwitt

### DEC's net gamble



Time has passed, and no official word has come back from DEC and its initial seven third-party supporters on how Enterprise Management Architecture (EMA) is faring. DEC has already missed a tentative March release date for the initial specifications, and no new time frame has been mentioned.

It's no surprise that DEC has taken some heat for its inability (or refusal) to do battle with IBM's Netview and AT&T's Unified Network Management Architecture (UNMA) with something more solid than a concept and a promise of better things to come. But DEC claims that it wants to concentrate on serving up a long-term solution rather than rush a stopgap to market — as it claims AT&T has done. As for IBM's Netview, it is "a veneer over products 10 years old," claims DEC's network marketing manager Bill Gassman.

Of course, most users — including DEC's — like having a veneer that gives them centralized control and monitoring over the various components of their networks. DEC doesn't have one. It has thought seriously about "slapping together" a Decwindows workstation that can collect information from the six or seven Decnet management tools, Gassman says. But this would drain resources

Continued on page 46

## Boeing snubs MAP, chooses rival Decnet

BY ELISABETH HORWITT  
CW STAFF

SEATTLE — Boeing Co., a major proponent of the Manufacturing Automation Protocol (MAP) networking standard, has chosen DEC's proprietary Decnet for its largest computer-integrated manufacturing installation to date.

Digital Equipment Corp. will act as the prime contractor, providing data management and control systems for Boeing Commercial Airplane's new sheet metal facility. DEC won the contract, estimated at \$50 million, away from IBM and Arthur Andersen & Co. subsidiary Andersen Consulting, according to one source.

The contract is a direct result of a two-year effort on DEC's part to develop solid partnerships and integration products with other manufacturing automation vendors, according to Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Cambridge, Mass.

In contrast, IBM only recently began aggressively developing such manufacturing partner-

ships. "Boeing's charter was to do this project very quickly and to rely on off-the-shelf products — minimizing custom, internal development as much as possible," Friscia said.

DEC won because "it was able to pull together a number of partners and walk in with an integrated team offering that requires minimal customization and no new porting of applications."

The facility is scheduled to go on-line in two years — which is "impressive for a project that size," Friscia said.

### Backlog blues

Boeing is building the facility in response to an industrywide, multiyear backlog for commercial airplanes, in which sheet metal production plays an integral part, according to Tom Beckwith, DEC's CIM strategic account manager. "So they need to get the facility up and running as quickly as possible," he added.

The new Sheet Metal Analysis, Retrieval and Tracking System will eliminate "a lot of manual labor involved in scheduling parts," streamline scheduling

and reduce the time that materials sit in inventory while parts wait on the shop floor, said Boeing spokesman Bryan Barber.

"Right now, it takes 40 days for a part to be scheduled through various shops, when actual time spent working on the part is maybe four or five days," Barber said. "This way, we'll get things just in time."

Factorywide communications will run on DEC's Decnet and Ethernet products. Boeing avoided MAP because "MAP is not mature enough at this stage to risk this factory," according to a spokesman for one of the project's contractors, who requested anonymity.

"MAP still requires a lot of custom software, while Decnet-Ethernet is proven, installed and

used extensively by all contractors in the contract," the spokesman said.

While the principals would not give a dollar value for the contract, Friscia estimated it at approximately \$50 million, or 20% to 25% of the \$235 million budget for building the new facility.

The system will use DEC VAX 6300s as area control systems, Vaxclusters for overall control and Vaxstation 3200 workstations to monitor production.

DEC will also provide links into scheduling, financial and other databases on IBM hosts, Beckwith said. Other contractors in the project include ITP Boston, Inc., Consilium, Inc., Deloitte Haskins and Sells and Oracle Corp.

## Power powwowing

OSI fuels proposal from utility industry R&D arm

BY ELLIS BOOKER  
CW STAFF

ST. CHARLES, Ill. — The electric power industry recently took a page from the story of the manufacturing field by announcing a communications architecture based on the Open Systems Interconnect (OSI) model.

The Electric Power Research Institute (EPRI), a research and development arm of the power utility industry, hopes to show its 600-member companies the architecture for information systems by the end of the year.

Representatives from approximately 50 power companies met here to discuss the so-called Utility Communications Architecture (UCA) with EPRI and Chicago-based Andersen Consulting. EPRI contracted

Andersen Consulting last October to research and develop the protocol.

The technical requirements of UCA, which are expected to be completed in December, promise to put a dent in the power industry's annual \$2.5 billion to \$5 billion communications budget, according to Lyle Ginsberg, manager of the UCA project at Andersen Consulting. "But we don't want to reinvent the wheel," Ginsberg said.

He added that EPRI and Andersen Consulting are looking closely at existing implementations of the OSI model, including the Manufacturing Automation Protocol (MAP) and the Government Open Systems Interconnect Profile (GOSIP). The research institute joined the

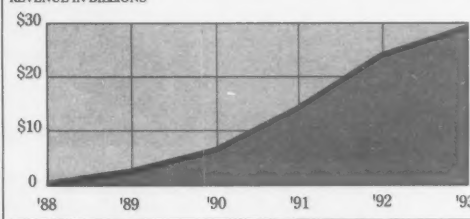
Continued on page 47

## Data View

### The emergence of client/server computing

The market should come of age in the early '90s, with sales from clients, servers and associated software and services totaling \$29 billion by 1993

REVENUE IN BILLIONS



SOURCE: FORRESTER RESEARCH, INC.  
CW CHART: DOREEN DAHLE

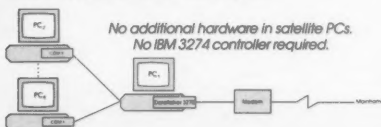
# Link 8 PCs to Your Mainframe Only \$2,395

### DataTaker 3270 features

- File Transfer (IND\$FILE)
- 12-32 Logical Sessions
- Application Programming Interface (API or HILLAPI 3.0)
- 3287 emulation for ASCII printers
- SNA or BSC Protocol

### DataTaker Hardware Options:

- Modern boards (201C, 208A/B, V22 bis)
- Co-processor boards (8088, 80186)
- Serial Interface Card
- PC/8 co-processor and MUX board



Micro Channel and PC bus versions are available for all boards.

### MSDOS-UNIX-XENIX

DataTaker 3270 now available for MSDOS, UNIX System V, XENIX and VMS operating systems.

For a FREE micro-to-mainframe guide, call 800/666-3270



**WINTERHALTER  
INCORPORATED**  
3796 1/2 Drive, P.O. Box 2180  
Ann Arbor, MI 48106

An Interface Systems, Inc. Company



# Horwitt

FROM PAGE 45

from the EMA effort.

Gassman claims that DEC's Vaxcluster network management software has offered for years the equivalent of AT&T's current UNMA product, Accu-master Integrator.

Both systems allow third-party management products to be plugged in as terminals and collect alerts and alarms. But this is basic stuff compared with what EMA will eventually offer, according to Gassman.

Key components of the system include the following:

- Access modules that allow a wide range of proprietary and standardized products to invoke the common functions described above. About 200 vendors have expressed interest in developing such modules, Gassman says, but right now, DEC has kept the number down to a manageable seven.

DEC will develop modules for its own network management products as well as for Transmission Control Protocol/Internet Protocol and Open Systems Interconnect network management protocols.

- Real integration of logical and physical sides of the network. EMA will break up different logical and physical elements of the network — not just multiplexers and modems but different electronic mail systems, for example — and allow communication between these domains to locate trouble spots and fine-tune traffic flow.

- An object-oriented database management system that will be the foundation for expert system applications. "That's one of the nuts we're having a tough time cracking," Gassman admits.

IBM and DEC — not to mention others — are promising such capabilities, too. But DEC's strategy is to present itself as the slow-and-steady tortoise that, by perseverance and a refusal to settle for easy stop-gap solutions, will be the first to deliver what users really want.

Will users be willing to wait years for DEC to deliver? Maybe so, considering that other vendors' complete solutions are also years off.

"We're talking 1992 before IBM has a relational DBMS" as well as "pieces and elements" that can handle telecommunications networks, remarked one Merrill Lynch telecom executive.

Since "it's not our business to be building" such a system, Merrill Lynch will probably hold off on any integrated network management solutions and "wait for the industry to settle it," he adds.

Horwitt is a *Computerworld* senior editor, networking.

# Midwest managers plan to launch David user group

CHICAGO — A number of Midwest customers recently met here to inaugurate the David Systems Users Group, which will provide participants with a technical forum and an interface to the vendor for resolving technical problems.

A board of directors and a

slate of officers were elected. Doug Marlowe, manager of Northwest operations at Chicago-based R. R. Donnelley & Sons Co., was named the group's chairman, and Monica Malowski, division manager of voice communications at Continental Bank in Chicago, was

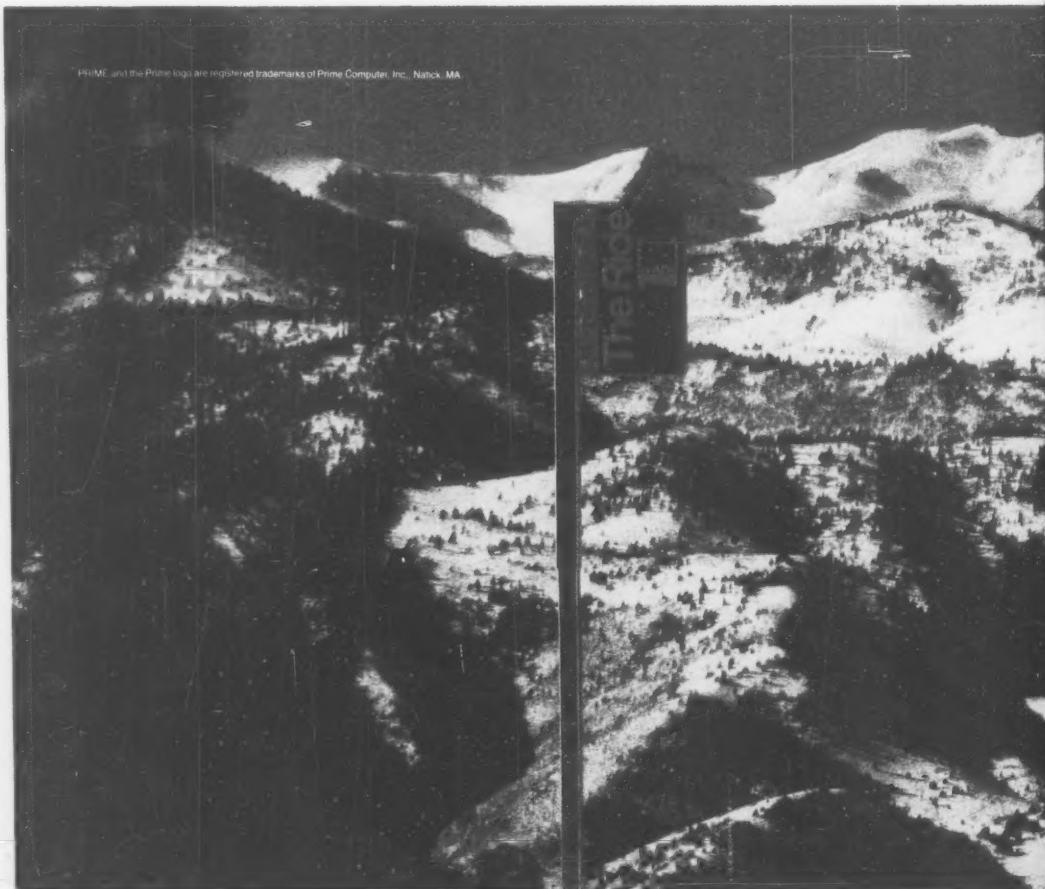
named vice-chairwoman.

Quarterly meetings are planned, and the next one is scheduled for April 18 in Chicago.

David Systems, a local-area network and private branch exchange supplier, said it has several hundreds of customers na-

tionally. "We need to keep Ameritech [David's Midwest distributor] and David on their toes, and this is an excellent way to do that," Marlowe said.

Vicky Hollander at Continental Bank is the program committee chairwoman and can be reached at 312-923-3310.

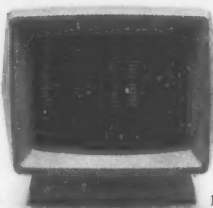


# WE HELPED 43 RESIDENTS DISAP

Every day, buses from the Regional Transportation District make 171,000 commuters disappear from bus stops throughout the greater Denver area. That's more than 43 million riders every year.

And how do they manage to keep things running smoothly?

With the help of computer systems



from Prime.

We provided the RTD with the capacity to handle more than 5,000 telephone requests a day for scheduling and information. Providing specific details on all 2,300 miles of routes at the touch of a button.

The system can also schedule routine maintenance for the RTD's fleet



# Powwowing

FROM PAGE 45

MAP/TOP Users Group last year. In fact, Mike Kaminski, manager of General Motors Corp.'s advanced engineering staff and perhaps the nation's leading MAP advocate, delivered the second-day keynote to the utility group March 22.

Kaminski, who sits on the board of a high-level advisory group within the power industry that initially recommended investigating OSI applications, discussed the advantages of open, international communications protocols. He also encouraged the utility industry to help drive MAP as the standard.

Lawrence Mankoff, project manager at the electrical sys-

tems division of EPRI, said UCA will address one of the power industry's unique needs — integrated real-time data acquisition. "Electric companies are among the largest users of real-time systems," he said. "If you run a nuclear power plant, you have to respond in milliseconds to a line outage." An incentive of this nonproprietary architecture, he said, is that it will protect the power firms' equipment and system investments.

According to Andersen Consulting's figures, a medium-size utility can spend \$35 million to design, implement and maintain a customized, often vendor-proprietary, communications system.

Currently, IBM dominates the corporate IS centers at many power firms, but the computing

power inside the plants — those used for supervisory control and data acquisition (SCADA) applications — is typically provided by firms such as Digital Equipment Corp., Harris Corp., TRW, Inc. and Data General Corp.

The prospect of using UCA to connect existing SCADA systems was voiced by a few attendees. "It's not an issue of the SCADA system connecting to the IBM mainframe," said Joe W. Lola, senior IS consultant at Central and South West Services, Inc. "It's a matter of communicating across many SCADA systems and with other utilities."

"We have fiber between the plants," said Gerald H. Luttman, supervisor of communications systems at Southwestern Electric Power Co. "But how do we make them talk together?"

However, because OSI-based architectures such as MAP, GOSIP — and now UCA — are evolving, they have some gaps. Andersen Consulting's Ginsberg admitted that the OSI model's network management component is still fuzzy, a point of concern heard from a few of the attendees at the EPRI event.

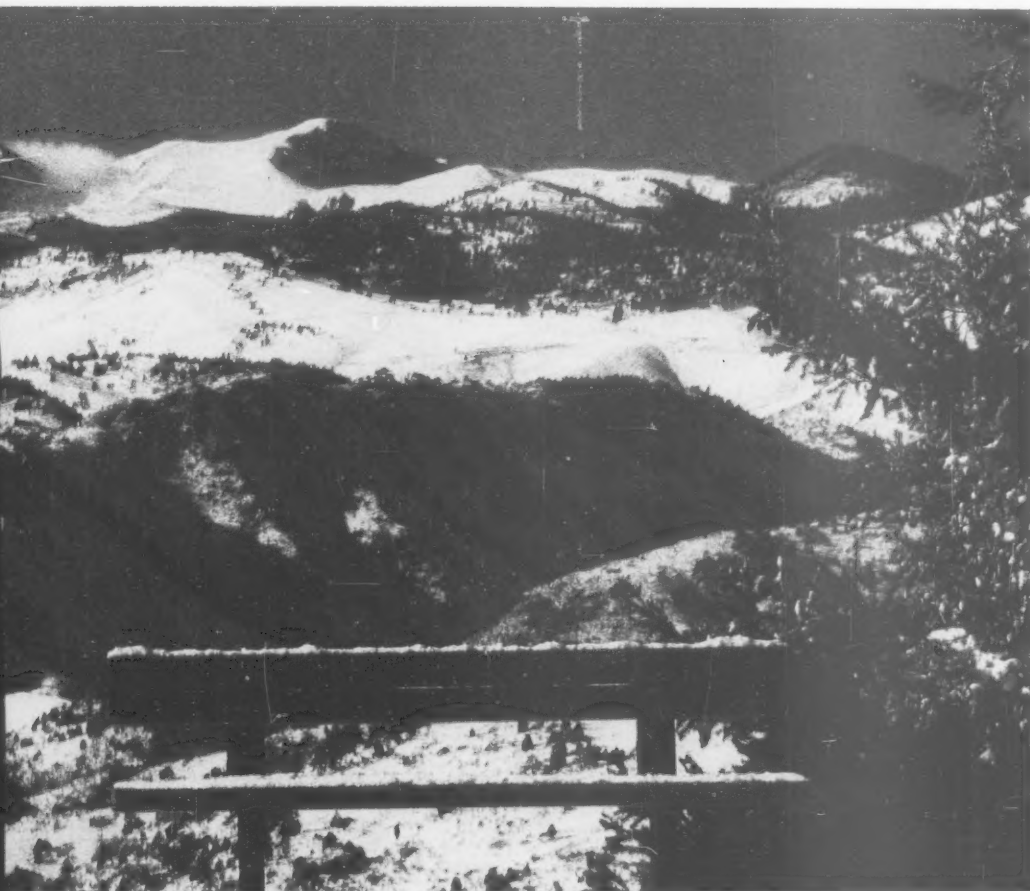
## BIT BLAST

# NET unfolds ISDN plans

Network Equipment Technologies, Inc. has announced that its IDNX line of T1 switches has been certified to act as a pipeline for Integrated Services Digital Network transmissions from Northern Telecom, Inc.'s SL-1 private branch exchange (PBX) switches. The switches do not yet support the ISDN D channel protocols that would allow them to participate as routing and control nodes on an ISDN network, said NET product manager Tim Shafer. NET plans to provide that support; meanwhile, it will certify its switches to act as ISDN pipelines for other major PBXs that support the standard, he said.

Advantage Systems, Inc. has agreed to integrate CompuServe, Inc.'s packet-switched network service with its own wholesale electronic banking services. Advantage Network Services targets current and prospective users of Advantage's Forte Financial Services System. Forte is said to serve customers of more than 45 banks worldwide.

American Airlines and United Airlines have entered an agreement to link their respective travel agent reservation systems, enabling agents on either system to get immediate confirmation and guaranteed bookings on either airline.



# MILLION DENVER PEAR INTO THIN AIR.

of over 700 buses. So when a bus needs a tune-up, the entire schedule won't break down. We even supplied a powerful system which organizes financial and human resource management.

The RTD is proud of the efficient transportation it offers. And their success is part of our success. Prime is a Fortune 500 company with annual revenues of over \$1.5 billion.

If you'd like to know how Prime can give you

more than token results, call us at 1-800-343-2540

(In Canada, 1-800-268-4700).

Prime. We can give you a lift.



Prime Computer, Inc.

Prime and the Johnson & Johnson Family of Companies are proud co-sponsors of the PBS series NOVA.

# OS/2 NEWS

A continuing report on advanced software for personal computers.

## Get a free IBM OS/2-based version of Sidekick for Presentation Manager.

When you order IBM OS/2™ you'll receive Borland's Sidekick® free (while supplies last). Sidekick for Presentation Manager™ includes an easy-to-use planner, phonebook, calculator and notepad using the graphical interface. It gets you off and running with IBM OS/2 today.

## Improved word processing software based on OS/2 is introduced by WordPerfect.

WordPerfect® has announced that a version of its best-selling word processor is now available for OS/2. The OS/2 version offers all the features of their popular MS/DOS® version while taking advantage of OS/2's capabilities, including multitasking. For additional information please call 1 801 225-5000.

## Accountants get true multitasking via ACCPAC Plus and OS/2.

ACCPAC® Plus System Manager/2 is an accounting software package from Computer Associates International. It allows simultaneous execution of multiple accounting functions by using the protected mode of OS/2. This enables users to enter sales orders while concurrently performing payroll calculations and printing financial statements. In addition, thanks to the Virtual Memory Feature of OS/2, users can toggle between a number of applications without having to exit one program and load another. For additional information please call 1 800 531-5236.

## Create exciting three-dimensional, dynamically developed maps using OS/2.

Mapmaking is easier than ever with MapViewer from Golden Software Inc. MapViewer uses OS/2 and Presentation Manager window screens to display two- and three-dimensional thematic maps. These maps can show



population density or physical contours, and include shading. For additional information please call 1 303 279-1021.

## Retailer begins use of OS/2 to monitor remote retail sales.

Host International has begun to use OS/2 to give computing capabilities to their individual concessions and to network shops with regional offices for daily downloading of sales and employee data. The internally developed system also provides for remote data entry, collection and reporting.

## Developing graphics for OS/2 applications is made easy with Toolkit from Graphic Software Systems.

High-performance graphics on microcomputers are made possible with OS/2 Graphics Development Toolkit from Graphic Software Systems. This package supports all OS/2 features while maintaining source code compatibility with the DOS Graphics Development Toolkit. It allows dynamic loading plus workstation

control. Functions for lines, arcs, polygons, circles, bars and advanced graphics are all



part of the package. For additional information please call 1 503 644-6746.

## Micrografx announces an easy way to port Windows applications to OS/2 Presentation Manager.

Micrografx® has introduced Micrografx Mirrors. This software development tool makes it easy to port any Microsoft Windows® application to the OS/2 Presentation Manager. It's currently being used successfully to port Micrografx Designer, Graph Plus, Draw Plus and Clip Art to OS/2. For additional information please call 1 800 272-3729.

## Free OS/2 Application Guide available.

You can receive a 700-page OS/2 Application Guide that lists and describes over 800 identified applications for the OS/2 operating system. For a free copy of this guide call 1 800 IBM-2468, ext. 120.

See OS/2 in action at Chicago COMDEX, April 10 to 13. Booth 1214, McCormick North.

**Microsoft®**

**IBM®**

Operating System/2, OS/2 and Presentation Manager are trademarks, and the IBM logo is a registered trademark, of International Business Machines Corporation. Sidekick, WordPerfect, ACCPAC and Micrografx are registered trademarks of Borland Corporation, WordPerfect Corporation, Computer Associates International and Micrografx Corporation respectively. Microsoft, the Microsoft Logo, MS/DOS and MS/Windows are registered trademarks of Microsoft Corporation. © 1989 IBM Corp. © 1989 Microsoft Corp.

# MANAGER'S JOURNAL

## EXECUTIVE TRACK

**E. O. (Skip) Stout** has been named staff vice-president of information systems and services at Navistar International Transportation Corp. in Oak Brook Terrace, Ill. Stout is responsible for all Navistar IS activities and reports to Michael Clayton, vice-president of corporate planning and information systems services.

Stout is also responsible for implementing Navistar's wide-ranging information management strategy, including centralization of IS operations, decentralization of applications development and creation of a corporate information library. "We're coming to grips with what the information utility concept really means," Stout said.

Stout was Navistar's director of technology engineering. He joined the Chicago-based firm in 1983 as a senior network consultant.

**James P. Keatts** has been promoted to vice-president of data security at First Virginia Services, Inc., the data processing affiliate of First Virginia Banks, Inc. in Falls Church, Va.

Keatts joined First Virginia Services in 1984 as data security administrator. He was promoted to DP security officer in 1985 and to assistant vice-president in 1988.

**Nils Hokansson** has been appointed vice-president of DP at York Insurance Group of Maine in Westbrook. Hokansson joined York in 1988 from Hartford Fire Insurance Co., where he served in a number of DP management and staff positions.

### Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any job changes in Executive Track. When you have news about any staff changes, be sure to drop a note or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

## Sound systems in Dixieland

*New Orleans bank VP maintains high-tech harmony through old-fashioned values*

BY JAMES DALY  
CW STAFF

For generations, New Orleans has built a reputation around the good life. The city's scorching Dixieland jazz, lip-searing jambalaya and unbridled carousing of Mardi Gras draw party-goers like moths to a flame.

One thing that The Big Easy is not famous for, however, is being a nesting place for companies employing leading-edge computer technologies.

But the city's acclaim for high times rather than high-tech may be unfair. Only blocks from the ornate grilled balconies of the fabled French Quarter stands First Commerce Corp., a \$4.2 billion bank that has also carved its reputation through some equally attractive old-fashioned charms: dependability, consistency and accuracy. James C. Granier has a lot to do with that.

Granier, senior vice-president of the information systems division and a 22-year veteran of the firm, says he believes it is much less important to plant leading-edge technology signposts than to provide clear and correct data that can be accessed quickly. If the information is faulty, he says, the firm's chances of success are comparable to those of a house of cards in a twister.

"What we're talking about is trust," says Granier, 45, in a gentle Southern accent. "The information we provide must not only be timely, it must be accurate."

"Accuracy" is a catchword that comes up a lot in a talk with Granier. He knows that without it, the bank's employees cannot do their jobs. He also knows that without it, he may as well shove his \$23 million annual IS budget into a shredder.

"We'll spend money on additional resources, but what we get out must

### PROFILE: James C. Granier



GLADE HILBY II

**Position:** Senior vice-president, IS division, First Commerce Corp.

**Mission:** Ensuring that information systems provide accurate, timely and relevant data to 340 bank employees

have a commensurate value, and that means it must be accurate," he says.

To achieve this, Granier keeps close tabs on all aspects of operations. Not that he mistrusts his 120-person IS team. "I have held almost every position I supervise now, so it makes it very easy for me to jump right in at a detail level," he says.

But he brandishes this sword gingerly and carefully avoids suffocating his subordinates. "He knows a lot about everyday goings-on, but he's never overbearing with it because I

think he enjoys being a teacher," says Max Kyles, manager of computer operations, who has worked with Granier for three years. "But when he's done, he'll tell you what needs to be done and expect you to do it."

The high standards are all part of making Granier's squad serve what he calls the real bosses of the 153-year-old company: the bank's 340 full-time workers. "The employees of First Commerce are our customers," he says. "And they need to be equipped

*Continued on page 51*

## Pitching executive information systems

BY ALAN J. RYAN  
CW STAFF

A Boy Scout is standing outside the supermarket selling raffle tickets. He tells you the prize is \$100. You buy one. The Girl Scouts come to your door selling cookies. You buy some. Even when you are taking a chance, as with the raffle ticket, you still know exactly what you could end up with.

Unfortunately, selling your chief executive officer on an executive information system (EIS) might not be so easy, nor the benefits so easily explained.

According to a new Arthur Young white paper titled "Implementing Executive Information Systems," the

best way to go about selling an EIS in-house is by starting at the top. "Convincing supervisors and midlevel managers that an EIS is a good idea may be constructive," the report states. "However, an EIS is for executives, and they are the ones who will ultimately decide whether or not the EIS has value in the organization. Accordingly, a top-down approach tends to be the most appropriate."

Still, knocking on your CEO's door with a handful of literature on EIS is not the best approach, either. Instead, the report suggests the information systems manager find an executive sponsor who will be able to not only sell his peers on the concept but also be able to break through roadblocks that may come from lower-ranked staffers

resistant to change. Such a sponsor should have the respect of the other executives and have a track record for results.

The report adds that an EIS sponsor will often volunteer for the job because he understands the benefits of EIS and wants to see them realized.

Because an EIS is not easily justified by concrete, identifiable cost savings, those promoting the EIS might want to be armed with tangible savings that an EIS can bring about. Savings might include less paper use, clerical time and executive time.

The study does say that the idea of cost justification may not even come up because "executives intuitively understand the value of having all the information they need at their fingertips."



# Insurance conclave advocates IS reform

BY CLINTON WILDER  
CW STAFF

ORLANDO, Fla. — Insurance companies must make their information systems more decentralized, flexible and responsive, some 1,600 insurance industry IS professionals were told at the recent Life Office Management Association (LOMA) Systems Forum '89 here.

More than one conference speaker quoted economist Arnold Schumpeter's maxim that capitalism means "creative destruction" and exhorted attendees to break down traditional technology and organizational structures to compete in an industry in which electronic distribution methods are becoming a

crete functions such as actuary, claims, sales and marketing that fail to communicate with other functions in the company. Instead, these functions need to share information electronically via messaging systems, strategic cross-functional systems and common databases such as cus-

tomers information files.

"Independent databases are both redundant and inconsistent," said James A. Langenwaller, a director of The Innovative Group, a Pittsburgh-based consultancy specializing in customer information file design.

The strategic use, delivery

and presentation of data itself — not hardware or software — will be the focus of insurance industry IS in the 1990s, said John A. Fibiger, president of Boston-based The New England. "The technology limitations are going away," he said.

Nearly all speakers agreed that senior management must take the lead in implementing change by rethinking their busi-

ness, taking technology investment risks and rejecting traditional IS accounting methods.

"You almost have to go on instinct," Fibiger said, when asked how he measures the effectiveness of IS at The New England. "No cost-benefit analysis will substitute for the informed guess about where the company is going and how technology will support that goal."



MIT's Treacy

critical success factor.

"We're really at a moment of crisis," said Irwin J. Sitkin, vice-president of corporate administration at Aetna Life & Casualty, who recently announced his retirement [CW, March 13]. "We're sitting on top of a lot of embedded systems written in Cobol. The biggest challenge for the chief IS executive is to deal with all the change that's coming at him."

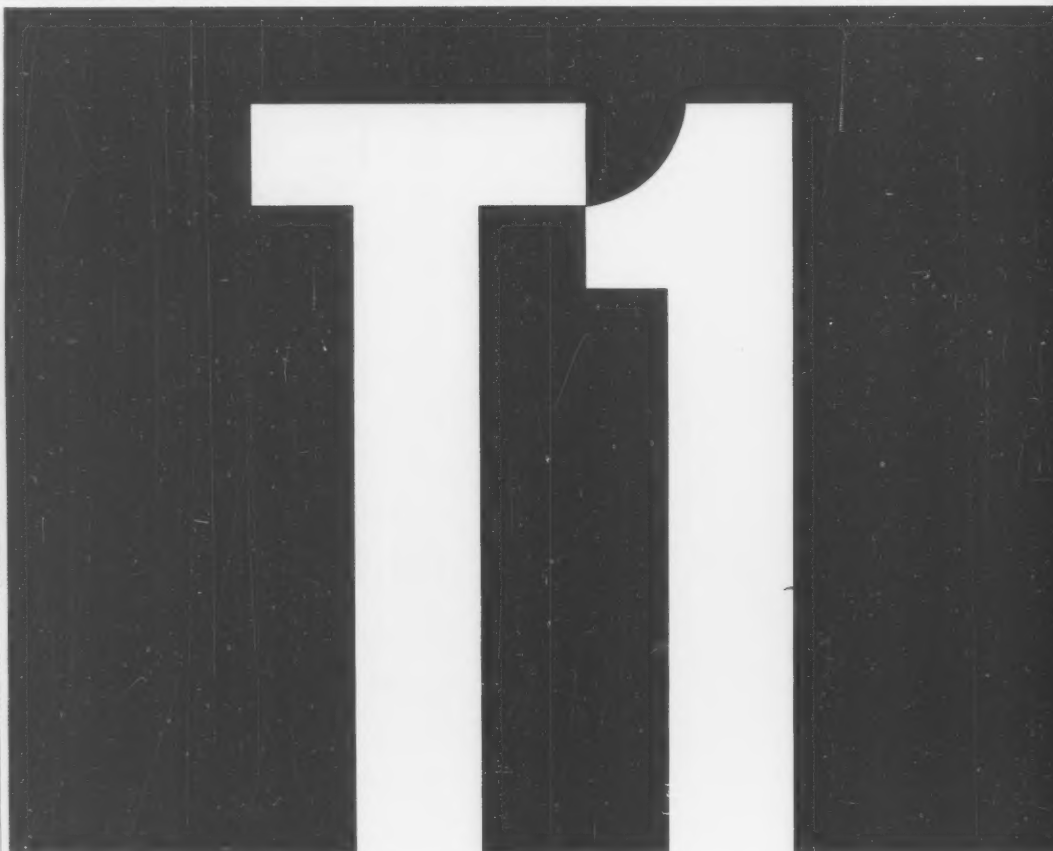
## Toughest competitors

Several LOMA speakers warned that the toughest insurance competitors in the near future will not be the insurance giants but new entrants into the business making use of imaging, expert systems and videotex technologies.

"Experience is turning from an asset into a liability, and IS organizations are part of the problem," said keynote speaker Michael E. Treacy, a professor at MIT's Sloan School of Management. "We've automated historical ways of doing things, and that has made our organizations too inflexible."

"The worst thing you can do is automate the business you're in today," said James P. Ware, principal of the Nolan Norton Institute, a Lexington, Mass.-based IS research concern.

Treacy called traditional insurance IS the automation of "separate stovepipes" — dis-



## The networking T1 from the #1 name in network solutions.

Meet Omnimux® 8000. The newest addition to the most complete T1 product line in the industry...a range of solutions that covers everything from channel banks and DACS to the most sophisticated, multi-nodal, networking T1 muxes.

Built with over 30 years of networking knowledge, the mid-range 8000 puts our experience to work for you. To make T1 more like you'd like it to be. More affordable. More reliable. More manageable.



More affordable, because **modular architecture** lets you buy only the features you need. The result: a customized T1 solution just right for your network. And for your budget.

More reliable, because **redundant integral CSUs** — both primary and hot back-up spare for every T1 line — ensure maximum uptime. You don't waste time and money replacing CSUs. You won't lose your diagnostic database either. And you can tell the difference between T1 line and CSU problems faster and easier, too.

More manageable, because instead of the risk of a single point of failure, you get **single point control** of both CSUs and T1 muxes. One menu-driven, integral network management system gives you comprehensive tools to ensure maximum network availability.

Want more? How about bandwidth contention. Bypass, automatic alternate routing, and drop/insert. Versatile data and voice support. And still more. All at a price you're sure to like.



## Dixieland

FROM PAGE 49

with the finest tools for the job. In most cases, those tools are the information we provide."

To that end, Granier stays in close contact with his staff. A meeting takes place every Tuesday at 9 a.m., and "it would take a pretty serious act to stop us

from having that meeting," he says. "It's basically a roundtable talk where we can talk about problems we're having or causing each other."

Granier sweetens his intimate knowledge of what makes the bank tick with a self-deprecating sense of humor; in front of staffers, he proudly claims to be "the fattest jogger in my neighborhood."

Granier is not above having himself and his office judged. Each quarter, the IS division goes in for a quick reality check when a rating survey is dropped into the mailboxes of administrative personnel ranging from department heads to a head teller at a local branch.

"We compare what we think of ourselves with what others think. It's always very enlighten-

ing," Granier says.

But the checks do not stop there. Some quality control reports come out daily. These summations can measure everything from the percent of work that arrives on schedule to the response lag time.

"If it's late, we want to know why it is late; if things are off, we begin an analysis immediately," Granier says. "The smaller

problem is often indicative of a larger one: Is it hardware or software breaking down, or are we running out of power on the mainframe?"

Like many people in his position, Granier joined the information processing industry when the field began to flower in the 1960s. But it was not his first choice as a profession.

After graduating with a de-

**H**E KNOWS a lot about everyday goings-on, but he's never overbearing with it because I think he enjoys being a teacher."

MAX KYLES  
FIRST COMMERCE

gree in general business from a nearby state college in 1965, he began work as a mathematics teacher. But the pay was poor, and he was not getting anywhere. Night courses in psychology at nearby Loyola University and Tulane University occupied his spare time.

### Analytical attraction

A newspaper ad for programmer trainees soon caught his eye. "I liked the analytical part of it," he says. He soon found himself with a job as a programmer trainee at First Commerce. Working on an IBM 1401, he found his new profession "very exciting. Everything was new and being designed. Even today, we are still rewriting and redesigning the same basic principles put in place 20 years ago."

The core of First Commerce's computer network resides at a data center about 10 miles west of town, where a 5-year-old IBM 3081K and an IBM 4381 reside. These machines hook up the five affiliate banks that make up First Commerce.

These machines also help power First Commerce's Callfirst system. Using Callfirst, customers can satisfy many of their banking needs over the phone. By dialing a specific number, customers check on their account balances, transfer money, get an update on their last five checks or even pay their Visa bills.

Although Granier takes his job very seriously — 10-hour days are the norm — he is not obsessed by his profession. He loves sports and beams when he speaks of spending time with his family.

Still, once the day's starting whistle blows, he is dead serious about his plans for First Commerce.

"Trust is really the key," he says. "If we don't have that, we're not much of a department."

## We stand on our record, but never rest on our laurels.

We're working to add leadership in T1 to our history of achievement. And if our track record is any guide, we're the networking company you can count on for quality, reliability, and stability.

Our full T1 line is just part of a comprehensive range of network components that encompasses modems, DSUs, fiberoptic products, statistical multiplexers, data encryption products, X.25 systems, and network management systems.

What's more, we go far beyond hardware and software to provide total customer support in

Building better networks

82 countries...before, during, and after the sale. We can help you plan, design, implement, manage, and maintain any size network, anywhere in the world.

You don't have to take our word for it. For example, Datapro\* said, "...a full-service systems supplier...solid products that perform as promised." And IDC\*\* found Racal-Milgo holds the largest share of both domestic and international markets for network management systems. You can expect the same commitment and long-term performance from Omnimux 8000.

For more information, call toll-free 1-800-327-4440 (in Florida, 1-305-476-4811). Federal Government users, 1-800-327-7909 (in Florida, 1-305-476-4452).

Omnimux 8000. Now, that's more like it. But then, that's Racal-Milgo. Reaching beyond today's standards.

\*Datapro, *User Ratings of Network Management Systems*, September, 1988.

\*\*International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.


**Racal-Milgo®**  
RACAL

# ForeseeaBull



# KNOW BULL

Copyright © 1997 by Johnson & Johnson, Inc.



Some people claim you can't see the future—  
but they're not spending \$600 million a year on  
research and development.

We see computers you converse with, compu-  
ters capable of independent thought, computers  
made of organic material.

And we're seeing them more clearly every day.  
We're Bull. A computer company for a business

environment that's faster, harder, and more punish-  
ing every year. An environment in which traditional  
ideas no longer work.

To succeed today, you need a different kind of  
computer company. A new one.

Know Bull.

1-800-543-6699. Phone for a copy of our  
corporate brochure.

---

**Worldwide  
Information  
Systems**

---

**Bull**

# Cut XENIX database development costs.

**Special offer.**  
SQL development system  
only \$795.

Seldom has so much been  
available for so little.

Introducing the SQL  
Developer Series from Informix.  
Which consists of, take a deep  
breath, the XENIX version  
of INFORMIX-4GL RDS/ID (our  
powerful INFORMIX-4GL  
Rapid Development System  
and Interactive Debugger) plus  
INFORMIX-SQL (our best-  
selling relational database  
management system).

And for a limited time, you  
can get all that software (up to  
a \$5540 value) for only \$795\*.

**Develop in XENIX.**  
**Port to large systems.**

Better yet, the software is  
as special as the offer. You see,



the SQL Developer Series lets  
you quickly and easily develop,  
debug and compile your SQL  
application in XENIX. And be-  
cause the application you  
develop is in p-code, it's directly  
portable to UNIX and a  
variety of networks without  
rewriting or recompiling.\*\*

**Clip this ad to cut  
your costs.**

Simply put, the SQL  
Developer Series is the most  
productive, least expensive  
way to build SQL applications.  
So order yours today. Fill out  
the coupon portion of this ad  
and send it to the address  
below. Or call (415) 322-4100,  
ext. 418.

**INFORMIX**  
\*1 for good reason.

\_\_\_\_ Please send me the SQL Developer Series for \$795 (shipping included).

\_\_\_\_ 3½" diskettes \_\_\_\_ 5¼" diskettes \_\_\_\_ Tape cartridge

Machine type \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_ User or VAR? \_\_\_\_\_

Company \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

Method of payment. Circle one. Check M/C VISA AMEX

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_ Signature \_\_\_\_\_

Mail to: Informix Software, Inc., Dept. DP88, 4100 Bohannon Drive, Menlo Park, CA 94025. Prices in U.S. currency. Offer good in U.S. and  
Canada only.

\*Offer expires June 30, 1989. Ask us about run-time licenses for UNIX, XENIX and networked DOS systems.

\*\*Obviously, mixed 4GL/C programs or code written to take advantage of specific operating system features may need to be rewritten or recompiled.

Informix is a registered trademark of Informix Software, Inc. All other names indicated by \* or ® are trademarks or tradenames of their respective manufacturers.

© 1989, Informix Software, Inc.

CW4/3/89



# EXECUTIVE REPORT

## COST CONTROL AND JUSTIFICATION

### The push for proof of information systems payoff

BY MICHAEL L. SULLIVAN-TRAINOR

**F**aced with tight budgets and new business requirements, MIS executives are going to extremes to prove the value of computer investments.

For example, Robert Rubin, information systems director at Philadelphia-based Pennwalt Corp., recently told the company's senior management about the benefits of a cash-management application to the firm's earnings per share.

"I did it to reinforce the fact that we view systems as a supporting element of our business functions and not as a cost," Rubin says.

The new system's impact on earnings per share was minimal but measurable. The chemical firm's management got the point and agreed that the system did add revenue to the bottom line.

Although Rubin's cost-justification method may be unusual, the circumstances he faces are not unique. Senior management is putting MIS under a double-barreled gun, asking MIS to develop revenue-generating strategic systems while demanding tighter cost controls.

"If all you are is a cost to the company, you shouldn't be there," Rubin says, echoing the cries of management.

Why are chief executive and financial officers suddenly paying attention, after years of acquiescence to budget increases?

"There is greater urgency to justify expenditures because of cost pressures within the corporation. IS budgets have reached a dollar level that makes them stand out on the balance sheet," says Robert Morison Jr., co-director of Partnership for Research in Information Systems Management (PRISM), a joint research service of the Index Group, Inc. and Hammer & Co.

Sullivan-Trainor is a *Computerworld* senior editor, special projects.



JOHN MARTINI

**Pennwalt's Rubin uses the language of finance when he talks about information systems**

based in Cambridge, Mass.

In fact, IS investments now rival research and development budgets in many companies. For instance, Rockwell International Corp. is spending \$450 million per year on information systems, not including investments in technology outside of MIS, according to the 1988 *Computerworld Premier 100*. The large amount being spent in MIS creates greater contention with other departments for closely held corporate dollars.

"We are being asked new questions. Executives at the top want to know why IS is getting to be so big and whether we are

getting a real payoff from it," says James Sutter, director of information systems at Rockwell.

These questions are sparking a sudden interest in competitive data about information systems. Frequently cited examples of successful strategic systems, such as American Airlines' Sabre reservation system and American Hospital Supply's client-based ordering system, have caught senior management's attention. Realizing this, MIS executives are trying to establish the idea of technology as an asset in competitive positioning. Some even gather ammunition for their board meetings by trading

budget information with others in their industries.

Such strategies are a concession to the fact that the justification and control techniques used in the past do not satisfy today's more cost-aware and payback-conscious senior management. In some instances, these methods have impaired the credibility of MIS.

"There has always been justification for projects as long as I can remember, and sometimes it was as spurious as you could get," says Paul Berger, a Lawrenceville, N.J.-based MIS consultant. "But the actual measurement of MIS performance

#### INSIDE

#### Grumman's strategy to dispose of waste

Page 62

#### How to keep a check on escalation in development projects

Page 64

#### At Merrill Lynch, users learn about accountability

Page 68

## Payoff

FROM PREVIOUS PAGE

and contribution to the business is getting more attention now and that's the one that is tougher to do."

Berger illustrates just how far logic has occasionally been stretched by telling of an MIS department that justified word processing equipment purchases by counting the number of key-strokes made by each operator each day. An increase in key-strokes was supposed to provide after-the-fact confirmation of the system's value.

"It made somebody feel comfortable and was quantifiable, but it was nonsense," he says.

What made the approach even more nonsensical, he adds, is that there were legitimate returns on investment (ROI) that could have been documented, but that were never raised.

Senior managers were never fooled by such flimsy justification. "I, Berger says, but they did not think that the costs were large enough

to worry about. The idea of using technology for strategic advantage had not even reached the pages of major business magazines, let alone cost anyone market share.

There was one MIS argument that senior managers did often buy, however. Unfortunately, it was the one that said systems investments could be justified through head-count reduction. Few IS organizations use that measure anymore, because it became outdated as soon as the major manual processes had been automated. MIS is still paying a price for its past reliance on this measure of value.

For one thing, MIS managers who were able to prove work force reductions as a justification for automation expenses are now stuck with the expectation they created.

"We dug our own grave by relying on head-count and expense reduction justification for IS in the past," Morison says. "That mind-set persists, even though the role and importance of information technology to the business is shifting."

A second problem with the head-count method of justification is that it often turns out to be more theory than reality and, as a consequence, sows seeds of doubt. No matter what measures are used by MIS now, some business executives remember and factor in the unfulfilled promises.

Another cost-justification quagmire for MIS is the tendency to use systems performance data such as CPU utilization to

justify systems to senior management.

"A classic error is to take internal measures and use them externally to prove that IS is performing well," Morison says. "That is seen as techno-gibberish by senior management."

For example, Berger relates a story about the vice-president of industrial relations at a company who once received a bill for running a personnel system. The bill registered CPU seconds, the number of I/Os and the amount of storage used for a total of \$2,000.

"When the vice-president received that bill, he asked, 'What did I get for my \$2,000?' Telling him that he got 500 CPU sec-

senior vice-president of information systems at The Travelers Corp. "But actually they are pretty simple."

For example, Bacon's group relays systems data to the business function in terms such as the number of reports that were required and whether they were delivered on time, whether the terminals were available and what the response time is like. Unlike technical jargon, these kinds of measures can be verified by user executives.

Perhaps the most prevalent tools used to cost-justify IS in large companies are the standard accounting measures applied by the financial side of the firm. These include calculations of ROI, discounted cash flow and hurdle rates.

While these measures are still widely used, there is a broad consensus forming among MIS executives and consultants that the use of accounting formulas should be restricted because they do not suit all cases. How that restriction is applied varies greatly depending on the company.

The main argument against standard accounting measures is that they do not take into consideration factors such as the broad impact of strategic systems. Such systems, critics of accounting-based justification argue, often possess intangible benefits, which cannot be churned through an ROI formula.

In the manufacturing area, for example, reductions in inventory are a measurable ROI payoff for implementing a manufacturing resource planning (MRP) system, but a broad-based computer-integrated manufacturing (CIM) effort is harder to pin

onds meant zip. It doesn't mean anything to me, and I know the difference," Berger says.

Performance results can be a good and valid measure of value, but only if they are presented in business terms that relate directly to end-user interests.

"If you present these measures in a technical way, you're in trouble," claims Larry Bacon,



Travelers' Bacon justifies systems with easy-to-understand data

## Measures that work

Partnership for Research in Information Systems Management (PRISM), a joint research service of the Index Group, Inc. and Hammer & Co., has identified the following as the major characteristics of an effective information systems performance measurement program:

- Measurement attention and effort are focused on areas that most need improvement. In many firms, many established measures are deemphasized and attention is shifted away from data center operations to systems development and end-user support.
- Measures are employed to understand and improve both internal performance and external relationships. This means taking measurements from two perspectives, for two audiences, in two languages

(one being nontechnical) and according to two degrees of need for improvement.

- Measures are formulated with their indirect as well as direct effects in mind. The content, emphasis, style and administration of measurement programs send consistent and positive messages through the IS and user organizations.

- User satisfaction is measured explicitly, via both surveys (formal and informal) and informal contacts, and user concerns are visibly acted on.

- Objective, quantifiable measures are supplemented by more subjective techniques, most often in systems analysis and end-user services. IS managers carefully balance intuition with quantification, recognizing the limitations and dangers of each.

- Measurement reporting includes concise, business man-

## Feeling the way

Measuring the return on information technology investment is primarily subjective for both CEOs and information systems managers, according to a survey of 70 of these executives

Measurement method	Percent of respondents	
	CEO	Information officer
Subjective	52%	45%
Only measures cost levels	31%	24%
Project-by-project justification	10%	29%
Competitive advantage	7%	—
Against long-range job plan	—	2%

SOURCE: BOOZ, ALLEN &amp; HAMILTON, INC.

CIVIL CHART: JOHN YORK

down in the stipulated terms.

"In true CIM projects where broad applications extend across functions, a new kind of thinking is required," Rockwell's Sutter says. "CIM causes organizations to shift and people's jobs to change. The whole process is different."

The problem is just as complex in other industries in which service employees are receiving the benefits of computer support, but productivity in terms of volume output is not significantly increasing.

For example, at Southwestern Bell Corp., MIS is implementing a system that will allow sales representatives to quote the rates of phone services more quickly. In the past, the employees did not even attempt to sell the services because the rate variations were too complex to explain without support.

"It is hoped that, because of the system, it will be easier for salespeople to offer those product lines and that will result in more revenue, but would you want to guess how much?" asks Malcom Bliss, vice-president of planning within Southwestern Bell's MIS organization.

The pressure to use accounting calculations to justify MIS investments is coming from senior management. CEOs and CFOs are familiar with the formulas and are no longer willing to authorize purchases on the basis of faith.

Senior management is challenging MIS to conform to standard cost accounting practices or come up with something better.

One tack that many IS executives are taking is to align their investment requests with the business strategy of the company, thus sharing out ownership and diffusing the responsibility for cost-justification and thereby taking the case for strategic systems beyond the realm of MIS alone.

At the same time, most of these same executives are reaching for definable benefits and charting new territory in assessing the value of information systems. The goal is a balance between qualitative corporate advantage and quantifiable benefits.

For example, Baxter Healthcare Corp. uses a two-level justification process. Routine projects are evaluated using accounting measures such as net present value, internal rate of return, payback and profitability. The decisions are made by lower level management.

Strategic systems are evaluated based on a grid that matches the projects against the long-term goals of the corporation. Senior management is involved at this level, providing their perceptions of where the business is heading and what support is needed to help it get there.

"We use the grid as a discussion document and give the project a high, medium or low ranking based on how it matches our goals," says Carl Steiner, vice-president of information resources planning and administration at Baxter Healthcare.

In the case of a strategic system that could potentially increase Baxter's sales and capture market share, the grid analysis method would require examining how critical the project is and whether there would be any loss to the company if it were not implemented.

"We have had a division between strategic projects and routine ones for a long time, but the different justification

processes have become more structured recently," Steiner says. In the past, he adds, IS tried to come up with an ROI rationale, but if that was not possible, the idea was simply passed along to business executives to evaluate it as they saw fit in light of corporate strategy.

At New York Life Insurance Co., most projects that could be shown to meet business needs were passed from proposal to implementation without much inspection. However, Michael McLaughlin, senior vice-president of information systems, says now the company is subjecting every proposal to greater justification scrutiny.

"Now, we have a good balance. There was a time when we put too little weight on the numbers. We always knew the cost, but we would say, 'This will meet our business needs, and therefore, we will do it,'" he says.

Almost any single project can be accommodated within McLaughlin's \$150 million budget, but not the myriad items put forward by business units, called profit centers, within the company. "There's a saying we have at budget time: We can afford to do anything, but not everything," he says.

Routine projects that are aimed at expense reduction or conformance to external factors are tested by a precise cost/benefit formula developed by the controller and MIS. Strategic projects requiring senior management review are weighed first on the scale of business advantage.

"Once the business case is sold philosophically or conceptually, then we get to the dollars," McLaughlin says.

One of the toughest sales pitches McLaughlin must make to senior management is to convince them to invest in unproven technologies. For example, New York Life, like most insurance companies, is considering new image processing applications.

"First I must persuade senior management that this technology is beneficial to our business," he says. "Then I have to convince them that we should change the way we do business to accommodate the technology and achieve the benefits."

So the debate continues, and the image applications are still being evaluated.

If firms such as Baxter Healthcare and New York Life are just beginning to inject more formal accountability into their systems, there are others that are ruled more stringently by numbers.

Charles McCaig, senior vice-president of information systems at Mutual Benefit Life Insurance Co., for example, must maneuver all but the most strategically imperative project proposals past the hurdle of a two-year payback requirement.

The process at Mutual Life involves

using accounting measures such as discounted cash flow. MIS reports the cost of the project and the user department forecasts the benefits. The controller acts as a "policeman" evaluating the numbers. If the financial formula shows significant benefit, then the project moves on for senior management review.

"If we justify it with hard-dollar payback, then that project goes to the top of the list. If we do it with soft, cost-avoidance dollars, we may get an okay, but those aren't as solid," McCaig says.

**"EXECUTIVES at the top want to know why IS is getting to be so big and whether we are getting a real payoff from it."**

JAMES SUTTER  
ROCKWELL INTERNATIONAL

McCaig is also proposing investments in image processing. But so far, the applications have failed to receive approval because of the two-year-hurdle rate.

"We have not gone forward with imaging because we have not been able to cost-justify it. We had three proposals for imaging and the payback was over three years," McCaig says. "We think we'll be able to do something next year because the cost of technology will go down."

One of the imaging applications carries a price tag of \$6 million. "Even adding in soft savings, the company's analysis can't come anywhere close to a two-year payback in benefits. We think there are bigger savings there, but we're stymied because the line area provides the benefit side of the equation," he says.

Despite this frustrating situation, McCaig is in a better position than two years ago when he had to justify the entire IS function.

"The company was going to make major cutbacks in everyone's budget and I didn't think that was an appropriate thing to do in the technology area, so we spent a lot of time on justification," he says. "Our goal was to make sure they understand the difference between the money that goes to pay the electric bill and money that's used to build a system."

It took six months for McCaig to prove his point. His staff spent the time gathering data about the costs and all the conceivable benefits of information systems.

Ultimately, McCaig showed that MIS had a \$40 million annual budget but was worth over \$500 million as an asset in terms of replacement costs.

"We showed them all the pieces and why they were there. We convinced them that it was an asset, and then they asked if the asset was doing anything. So we showed them that it was by demonstrating the improved productivity of the

Continued on page 61

## Time saved in the right places can add up to big efficiencies

BY DAVID GABEL

Information systems executives looking for ways of demonstrating the strategic importance of their function may want to seize the time issue.

Saving time is not a new concept. For the most part, however, the emphasis has been on improved efficiency at the clerical levels. By now, most of the savings that can be realized by automating functions among those groups have been factored; the real action has moved to other locales.

The places where organizations are looking for speedups now are in the synapses between departments and the executive suite. Fast-cycle capability is becoming the new buzzword as companies search for new ways to trim the time between development and product release.

Everyone is saying that speed and snap-to capability will determine the winners during the next few years, both in terms of beating the competition and staying a step ahead of tough economic realities. For example, a time-based competition study recently completed by the Boston Consulting Group cites instances in which clients, by taking time out of their operations, improved their labor productivity and their asset productivity by two and doubled their product-line breadth. Multiplying these together gives you an eightfold improvement just by being conscious of time spent doing things and then eliminating the wasted time.

At the executive level, time savings may not be quite as quantifiable, but it is every bit as needed, according to Jerry Kanter, director of the Center for Information Management Studies at Babson

Gabel is a free-lance writer based in Northport, N.Y.

College in Wellesley, Mass. "Every executive has problems with time these days," he says. "They are in a reactive mode when people are telling them to establish their vision, which is hard to do when you're in a sea of alligators."

It is not easy for MIS to reach into the areas where time compression is most needed. What makes it difficult, explains Paul Clermont, principal of Nolan, Norton & Co., a Boston-based consulting group, is that MIS people do not typically know a lot about sales and marketing or production and shipping, and time cycle reduction touches on all those areas.

Lack of specialized knowledge does not have to preclude IS involvement. What is important, says Rudyard Istvan, senior vice-president of the Boston Consulting Group, is to establish communication with relevant departments.

You can sometimes get results just by using existing technology to facilitate information sharing, Clermont says. For example, he notes, one of his clients wanted to develop a new product but did not have a large enough design staff in any one city to do the work. Because workers were not willing to relocate and the client did not have the time to shuffle people between cities, they invested in high-speed communications links capable of transmitting design and graphics information between the U.S. and UK. This allowed the client to handle design with few meetings, and the project was finished faster than would have been possible otherwise.

That kind of benefit does not fit neatly into the traditional capital-budgeting model, Istvan notes, but if the targets are well selected, the improvements will be indisputable. Even more important, they will speak to top managers in terms they can understand and appreciate. •



JAMES SUTTER  
ROCKWELL INTERNATIONAL

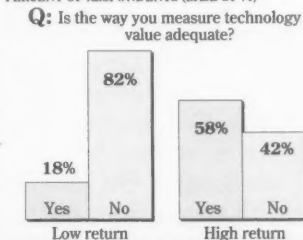


Babson's Kanter

### Degrees of distaste

Top executives usually blame their measurement systems when the ROI for information systems is low. But even when it is not, many say the measurements are too subjective.

PERCENT OF RESPONDENTS (BASE OF 70)



SOURCE: BOOZ, ALLEN & HAMILTON, INC.  
CW CHART: JOHN YORK

So the debate continues, and the image applications are still being evaluated.

If firms such as Baxter Healthcare and New York Life are just beginning to inject more formal accountability into their systems, there are others that are ruled more stringently by numbers.

Charles McCaig, senior vice-president of information systems at Mutual Benefit Life Insurance Co., for example, must maneuver all but the most strategically imperative project proposals past the hurdle of a two-year payback requirement.

The process at Mutual Life involves

## "End disk conversions forever"

**SDI**  
20 years of Software Innovation

Convert instantly to newer disk technology with Instant FBA™ or VM Magic™

Effortless migration	without any changes to operating system, programs or JCL, just with a simple backup and restore.
Save hard dollars	on control units; old disk device's lease and maintenance fees; floorspace; and people time.
Provide disaster recovery flexibility	supporting any environment regardless of disk architecture.

CALL TODAY. 1 (800) 537-1969

(415) 572-1200 In Europe: +31 10 436 12 77 1700 S. El Camino Real, San Mateo, CA 94402



# We're covering a revolution!

The invention and spread of computers in the last three decades isn't just a new technology finding its way into society. It's the start of a revolution in the way mankind operates: the end of the Industrial Age and the beginning of the Information Age.

For more than two decades, *Computerworld* has been the newspaper of record for the information systems professionals who are right at the heart of this revolution: the managers, executives and staffers responsible for the implementation of information systems at America's medium to large organizations.

As technology has changed from mainframe to mini to micro—and as low-cost computer-to-computer communications has become a reality, these professionals

have adopted the new technologies in a never-ending effort to keep their corporate information systems current. And they have relied on *Computerworld* to keep them abreast of the incredibly rapid changes that have characterized this business since the beginning. Today, *Computerworld* has a total audience of more than 600,000 computer professionals (ABC-audited). And it is truly the newspaper of record for information systems management.

To put everything in perspective, we have taken a brief look at where this young industry has been and how it is doing right now. It's all shown in the poster pictured here. Life size, it's 26" by 38", and it's full of interesting information on the new Information Age.



**"The new source of power is not money in the hands of a few, but information in the hands of many."**

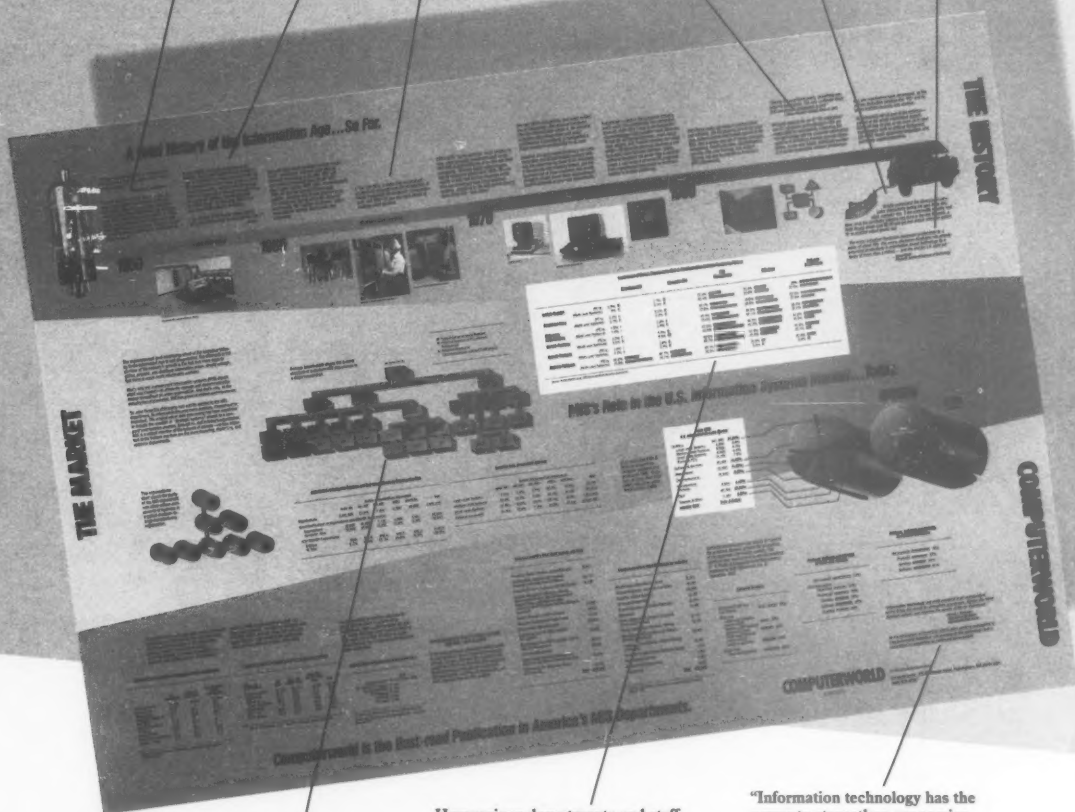
**In the 1950's, the United States left the Industrial Age and entered the Information Age.**

**In the mid-1960's, a major leap in computer productivity occurred.**

**We have entered the era of  
"PC Integration ..."**

**"If the automobile industry had done what the computer industry has done in the last 30 years, a Rolls Royce would cost \$2.50 and get two million miles per gallon."**

**"The entire Industrial Revolution enhanced productivity by a factor of about 100. The micro-electronic revolution has already enhanced productivity in information-based technology by a factor of more than a million—and the end isn't in sight yet."**



**The modern MIS Department  
adjusts to keep up with changing  
technology.**

**How various departments and staff get involved in the information system decision-making process in America's medium to large organizations.**

**"Information technology has the power to strengthen economies, tighten the bond between nations and improve the quality of life for individuals."**

This poster gives you a great opportunity to stop for a second and look at the forest instead of the trees. And if you're involved in marketing or promoting computer products or services, we'll be happy to give you a free copy for your wall.

Just contact Libby Levinson at  
(508) 879-0700.



**The Newspaper of Record  
for Information Systems  
Management**

An IDG Communications Publication

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY  
January 16, 1989 • Vol. XXIII • No. 2 • 110 Pages • \$3/Copy • \$44/Year

## INSIDE

**In Depth — What should you do about the PIM revolution?**  
Page 75



**Profile:**  
Gerry Connelly gains control over information at Meadowlands casinos. Page 81.

DEC desktop reaction:

- Customers are cautious. Page 112.
- Connectivity infrastructure strategy has gaps to fill in. Page 113.
- 'What, me worry?' Sun struggles off challenge. Page 113.

A series desktop model set to roll out from Unisys later. Page 2.

**Tough times** confront second-tier vendors as PC buyers turn to the Big Three. Page 4.

**Gap:** Continental Information Systems stumbles after acquisition, faces tough financial clinics  
Page 12

**HP plans LAN Manager**  
repackage for Unix  
systems. Page 8

**Despite 2000 delays,**  
IBM's high-end storage  
controller wins early user  
endorsements. **Page 27**

## BY MICHAEL MURPHY

**WASHINGTON, D.C.** — A U.S. Supreme Court ruling last week will allow states to tax interstate voice and data traffic.

With several states having already enacted such taxes and others desperately seeking new sources of revenue, the decision could raise the cost of business communications and affect the location of data centers.

The decision upholds an Illinois law imposing a 5% excise tax on interstate voice and data transmissions that begin or end in the state. Approximately a dozen states have similar taxes, and more states are expected to follow suit.

**Assaid with taxes:** Illinois collected \$142 million in taxes by mid-1987 and continues to collect revenue at a rate of \$10 million per month from business and residential users, according to a court filing.

## NAS deal brings

## BY JEAN S. BOZMAN

**SANTA CLARA, Calif.**—Months of uncertainty for users of National Advanced Systems CPUs came to an end last week with National Semiconductor Corp.'s sale of 50% of its mainframe unit to Micromax Tele-

After dozens of rumors about the potential sale, the deal — a total package estimated at between \$300 million and \$350 million — appears to guarantee continuity for customers, at least in the near term. NAS management will stay in place, and a small force reduction is anticipated.

some transaction networks such as airline reservation systems, may wind up moving their data centers to "tax haven" states that do not impose telecommunications taxes, according to analysts.

**Revenue cutbacks**  
A dozen states already have your firm and more are expected to follow as a U.S. Supreme Court

A map of the United States with a shaded region in the Pacific Northwest, specifically covering parts of Washington, Oregon, and Idaho, indicating the study area.

as new lineup

ated, a NAS spokeswoman said. But with Memorex Telex obtaining an option to buy out all of National Semiconductor's stock as an unspecified future date, further changes could occur.

<sup>10</sup>National obviously is broader.

## BY WILLIAM BRANDER

While several vendors use summary costs as an excuse to hike personal computer prices last year, no one is yet promising to bring them down now that the

According to memory-card product vendors and industry analysts, dynamic random-access memory chips are now increasingly available, and prices are dropping. Prices of 1M-bit chips are projected to plummet more than 50% by year's end.

"This will definitely affect site-location decisions," says Kenneth L. Phillips, vice-president of telecommunications policy at Citicorp in New York and chairman of the Committee on

of tax on interstate telecommunications  
all of last year's gross light from the

A map of the United States showing the distribution of various plant species. The map is divided into regions, with different shades of gray indicating the presence of specific species. The regions are labeled with numbers 1 through 10, corresponding to the species listed in the adjacent table.

in a different direction than the  
more before, but we're aware

aged that they kept half the company," said Richard Lester, vice president of corporate development at Seattle-based Associated Grocers, Inc., which runs NAS AS/TL 60 and 90/0. "We've done business with Memorex for several years and we're very comfortable with them."

Continued on page 109

BY DOUGLAS BAIRDEN

A glaring shortage of front-end development tools and the lack of a finished product has not stopped a handful of the U.S.'s largest corporations from building SQL Server applications.

It implements the so-called client/server architecture, under which a server handles document management while users' workstations provide the interface of front end.

Users who are anxious to get cracking have been forced to buy the \$1,995 Network Development Kit, which is essentially a beta-test version of the software.

Of the 800 units sold, some 200 to 250 have been snapped up by corporations, according to Microsoft SQL Server product manager Dave Kaplan.

**System:** One Airplane Services, a subsidiary of Texas Air Corp., already has a prototype application running under SQL Server, and the results are promising. Curt L. Abraham

Continued on page 11

that chip prices will fall below \$10 this year.

price for 1M-bit memory chips has

1.00	1.00
1.05	1.05
1.10	1.10
1.15	1.15
1.20	1.20
1.25	1.25
1.30	1.30
1.35	1.35
1.40	1.40
1.45	1.45
1.50	1.50
1.55	1.55
1.60	1.60
1.65	1.65
1.70	1.70
1.75	1.75
1.80	1.80
1.85	1.85
1.90	1.90
1.95	1.95
2.00	2.00

**\*\* Third Annual Computer Press Awards Competition (4/12/88)**

# COMPUTERWORLD

## Payoff

FROM PAGE 57

company," he says.

McCaig views the justification of MIS as a multistaged growth process that evolves as senior management and MIS mature together at a company. The stages are as follows:

- In the beginning MIS must run its own business. Management will not want to finance new projects if the network is down and there are a lot of problems.

- "A lot of organizations went through that. They couldn't get systems to stay up and they had runaway application development projects," McCaig says.

- The next stage involves MIS aligning with the business areas and establishing partnerships to develop some credibility with line managers.



**T**HERE'S a saying we have at budget time: "We can afford to do anything, but not everything."

MICHAEL McLAUGHLIN  
NEW YORK LIFE

- After that, senior management begins asking, "We are spending a lot on MIS, it works, and it seems to be doing what the line areas want, but I wonder if we are spending the right amount?"
- Once that question is answered favorably, the focus turns to getting the most out of technology through strategic applications.

"At the self-actualization stage, everyone believes MIS can make the difference: MIS is convinced, line management is convinced; now, we've got to figure out how," McCaig says.

Changes in the management team or the business can cause MIS to move backward in this chain of events, but McCaig contends that an organization cannot reach the more advanced stages without successfully completing all of the basics.

"If you have no credibility, you won't succeed with partnerships. If you don't have end-user computing, the business side won't understand strategic advantage," he says.

At the final stage of MIS ma-

turity, the organization ceases to be separate and is seen as an integral part of the business.

When MIS reaches that stage, some consultants and managers believe the question of "Are we spending the right amount on information systems?" does not make sense because MIS cannot be evaluated accurately outside of the business functions.

Many experts see that scenario as the only logical outcome and possibly the ultimate benefit. At their most effective, PRISM's Morison says, information systems and support will be so interwoven with the business that trying to analyze their worth as a separate entity would be "like pulling a number of strands from a fabric and holding them out to ask, 'What is their

value?' They have no value apart from the fabric itself."

MIS at Pennwalt comes very close to meeting this model. Rubin reports directly to the CEO and was brought on board to manage systems as a tool to improve profitability like any other business function.

An emphasis on increasing the bottom line does not mean that MIS costs must also grow.

In fact, Pennwalt has reduced the amount it spends on systems each of the past four years. At the same time, the company is keeping pace with its competitors' uses of technology to improve products and services.

"It's a myth that paying attention to business needs increases costs," Rubin says. "Being better focused on what you need to do can lower costs." •



## WHEN A LAN GOES DOWN DO YOU GO WITH IT?

Business stops when a LAN stops. And so can many a promising career.

Prevention is better than cure - and a whole lot less expensive. Which is why MIS professionals are turning to Spider network monitors to identify problems *before* they come up.

A SpiderMonitor helps you make your LANs work harder: it eliminates bottlenecks, improves resource-sharing, lets you plan for future network demand.

(It also helps you understand all the nuances of your LAN - learning as you work.)

SpiderMonitors are designed for complex multi-vendor environments and support all standard protocols on any IEEE 802.3 Ethernet network. Statistics, Performance, Summary, Test, Development, Traffic Generation: SpiderMonitors are six multi-tasking tools in one. With statistics

for network loading, capacity usage, performance and station activity - all presented in a logical, coherent way.

And all accessed through the friendliest user interface in the industry.

Choose from two models: a board and software kit for an existing AT or XT compatible, or a rugged portable unit.

A SpiderMonitor is a wise investment, fully backed by comprehensive, on-the-spot support. No wonder MIS professionals, installation engineers, software and systems developers rely on SpiderMonitors - worldwide.

To find out more, call us today on (800) 447-7807, for literature and a demo disk.

SpiderMonitors: the friendly, low-cost way to keep LANs up and running.

(And that means you, too.)



Spider Systems Inc., 12 New England Executive Park, Burlington, MA 01803.

Please send me: ☐ Full information on SpiderMonitors ☐ A 5 1/4" demo disk

☐ A 3 1/2" demo disk ☐ Please arrange a live demo on my network

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_

CW 489

**SPIDER SYSTEMS**  
We make networks work

All registered trade marks acknowledged.



# Grumman puts brakes on costs

How a strategic planning program is helping curb firm's computer expenses

## ON SITE

BY FRANK ORTOLANI

BETHPAGE, N.Y. — In 1984, the rate of computer growth at Grumman Corp. peaked at 30%. Since then, and as a result of a cost-justification program based on strategic planning, inflation has been significantly curbed.

For each of the past three years, we at Grumman have reduced our computer growth rate by 6% to 7%. In 1989, we expect to achieve a no-growth status for the first time.

It should be noted that during this same period, Grumman — a Fortune 200 aerospace, electronics and specialty vehicles manufacturer with 25,000 employees and more than 100 locations worldwide — revitalized its computerization and business methods. The result for us has been more value at significantly less cost.

Some credit for reduced computer growth must be given to the maturity of Grumman's computerization program. When we began our drive to control costs, there were already hundreds of mainframes, minicomputers and supercomputers installed as well as many thousands of terminals and peripherals in networked systems.

But because we continue to improve our systems and install new equipment and methods,

the main credit for the cost containment must go to our cost-justification program.

Thanks to strategic planning and the connected process of transforming business methods, the company has been able to achieve 10 years of benefits in just six years.

The reduction and stabilization of computer cost growth is clearly reflected in our bottom line. In addition, we have materially improved our strategic manufacturing and marketing abilities, which impact not only the present but also the future.

### Strategic benefits

Grumman's current approach to managing computers and computer costs is simple and straightforward. We say, in effect, that computerization can no longer be justified on a purely local basis — within a group, department or division of the company. Instead, there must be a direct connection between any proposed improvements and furtherance of the company's market position.

It must be demonstrated that new systems or system enhancements will serve a strategic purpose: to make Grumman a higher quality, lower cost manufacturer or to enhance the company's productivity, competitiveness and attractiveness to customers.

For example, if the food services department says it needs improved systems, we now ask

exactly how that improvement will contribute to the big picture. If the proposed change does not meet the criteria — if all it presents is a way to improve the food service operation and possibly produce a small savings — the request will likely be denied.

Our view is that strategic benefits are gained not only by



Grumman's Ortolani

what contributes directly to the bottom line but also by optimized computerization that serves as a resource for strategic information.

There are tasks that the company must do well in order to perform on contracts and market our capabilities. These "pressure points," which have become our guides to improving our computerization, include procuring materials, designing and manufacturing products, marketing our capabilities and gathering and evaluating information.

What we are talking about here is something very different from data processing. In fact, we've thrown out a lot of the old terms such as "task support," "departmental and divisional DP" and "islands of automation." We are more than satisfied with data processing as an effective way to manage data, a fact we take for granted. Now we are concerned with the creation and distribution of information and its maximally effective use in achieving strategic corporate goals. Some of the steps we have taken in this direction include:

- **Management planning.** At one time, information resources planning was a tactical, operational process for current and near-term needs. The various groups within the company did not regularly or exhaustively discuss these issues. Under the old regime, marketing, sales, productivity and the bottom line were not the main issues. Instead, what was evaluated was

the specific information resources request in its individual context.

Our current management planning process takes another view entirely. Top management plays a key role in evaluating proposed projects within the context of a five-year horizon. The process applies strategic business and market planning to such factors as technology, capital, facilities and information resources.

Projects of intermediate or low strategic benefit are still considered but are subjected to a traditional return-on-investment analysis and given lower priority.

- **Method examination.** Once the information resources department receives the go-ahead on a proposal, the project is evaluated and planned by a matrixed team made up of information resources staff, users and management.

Initially, we evaluate the current business procedures and question each step in the process. Our goal is not to lay new computerization over existing methods but to transform the methods into a new, more productive configuration.

We are currently doing this with procurement. Grumman has many procurement departments in its various divisions, but the company is no longer interested in improving a single procurement operation. Instead, our focus is on improving, linking and standardizing the company's total procurement process.

Another project Grumman is

test system developed for our aerospace products. By creating an on-line, real-time system that automatically analyzes flight test data, we have reduced total test time by 50%.

In some cases, that time savings has led to a reduction of 20% to 30% in total development time. Considering that the products Grumman develops are in the range of millions to billions of dollars, the cost savings and competitive benefits can be dramatic.

- **Information sharing.** Whenever we install or improve systems, we pay a great deal of attention to maximizing data flow and data sharing. We provide comprehensive connectivity and functionality across divisions, using architectures driven by our major installed base of distributed business, technical and scientific systems. While not limited to these architectures, we are partial to them purely on the basis of cost-effectiveness.

In applications, we seek to satisfy two needs at the same time — the end user's application need and the corporation's need for shared data. In the same way, we respond to common needs in our multiple divisions through either the integration of functional requirements or systems interfaces.

All new computerization will be based on Grumman's corporate architectural standard, including data dictionaries, data attributes and database management. While the content, quality and accuracy of the data are the responsibility of the division or department that creates it, all data is "owned" by the corporation in our scheme, which precludes private ownership.

- **Minimization of software development.** Although we remain willing to create new software if it is really needed and not otherwise available, we now encourage divisions to buy or integrate commercial software where possible.

We feel that many good software programs are available off the shelf at considerably lower cost than programs developed in-house. In addition, purchasing proven applications will also help us to improve — and possibly transform — operations because the products already implement successful business methods.

Another benefit of purchased software is that it is supported by the manufacturer, which is less expensive than trying to support it with in-house personnel.

Computers have more potential than most users realize. At Grumman, we feel that cost justification based on strategic planning has brought our corporation much closer to the full realization of that potential. •

**T**HANKS TO STRATEGIC planning and the connected process of transforming business methods, the company has been able to achieve 10 years of benefits in just six years.

currently engaged in is an executive information system. Although in the past we would have probably given management computer tools to improve what they were already working on, that is no longer the approach we take.

Instead, we try to provide management with a range of capabilities for problem identification, resolution and anticipation. Some of those capabilities include exception reporting and drill-down, trend and what-if analyses. Also, in contrast with past practice, management is now expected to submit its requests for systems of this type to the same macroeconomic justification process as any other group.

A third project, now complete, which dramatizes strategic advantages, is the automatic



## CD-ROM Strategies Workshop

### How to Develop A Successful CD-ROM Application

Presented by  
CD-ROM Strategies  
and  
Dietronics, Inc.

Examine existing CD-ROM applications and retrace their development steps. See live demonstrations of the data preparation process by the leading search and retrieval software vendors.

#### Faculty

Dr. Ash Pahlwa, Senior Partner, CD-ROM Strategies  
Mr. James Clark, Senior Partner, CD-ROM Strategies

#### Tuition

\$995. Includes complete course notes, daily lunches and more.

#### For Registration & More Information

18 Chenille  
Irvine, CA 92714  
714-733-3378  
415-261-6768  
FAX 714-630-1025

#### Locations & Dates

Los Angeles	April 24-27
San Francisco	May 30-June 2
New York	June 26-29
Boston	July 24-27
Washington D.C.	Aug 28-31
Chicago	Sept 25-28
Dallas	Oct 23-26
Anaheim	Dec 4-7

Continued  
Software, Inc.  
Database  
Technologies, Inc.  
Knowledge Access  
International  
Personal Library  
Software, Inc.  
Quantum Access,  
Inc.  
Retasco Inc.  
Unibase Systems,  
Inc.



To succeed today,  
you need powerful application  
development tools, and none are  
more powerful than PowerHouse.

But then, you may  
already have known that.

The numbers speak for themselves. More than 11,000 HP, DEC and DG sites worldwide develop the vast majority of their applications *entirely* in a PowerHouse® 4GL environment.

In fact, it's fair to say that no other application development software does more to *maximize the potential of hardware vendor databases* than PowerHouse.

**COGNOS®**

# Battling project escalation

BY RICHARD J. ORLI

The building of information systems has not yet reached the level of predictability that is taken for granted in traditional engineering disciplines. The result is often escalation, the increase of controllable project costs beyond planned levels.

Escalation is not always something that can or should be avoided. Sometimes it is the proper response to changing conditions and new information. Escalation

Orli is a consultant at Deloitte Haskins & Sells in Washington, D.C.

only becomes dangerous when no one notices that it is happening in time to react.

It is very easy for projects to grow in complexity and scope as different people with different needs become involved. It is also easy for projects to fall into traps of endless reviews, re-specifications, redesigns and recoding. That is why it is important that changes to projects and commitments of additional resources be accompanied with a review, by all parties, of the project's assumptions and goals. If additional resources seem to be required, then an informed decision must be made to either add these resources or bail out.

The basic causes of escalation boil down to errors in the original plan, errors in execution and changes to the project and its environment.

Plans are necessarily based on imperfect information, so it is no surprise that they are routinely wrong. It is also a safe bet that underestimates are more common than overestimates. Underestimation can involve unit costs, amount or availability of resources or the complexity and extent of the project. More seriously, it may be discovered that the project, as conceived, addresses the wrong problem. The real problem may call for a totally different approach, perhaps a major rework or an altogether new project.

Even with the best-drawn designs, execution errors are inevitable, and a cer-

tain number of them should be factored into every project plan. The estimation process should also assess the risks of using new methods and forging into unknown territories.

Project changes are common escalation culprits. Changes usually fall into one of four categories:

- Alterations in objectives or requirements because of environmental factors such as new government regulations, market opportunities and competition.
- Resource availability changes, principally involving key personnel.
- Shifts that affect project "personality." These might involve the arrival of a new project manager intent on remodeling the project to suit personal tastes or a change of customer representatives.

• "Gold plating," the addition of superfluous touches to projects in progress.

Gold plating is particularly difficult to identify and deal with because doing so calls for a subjective judgment.

A number of steps take the guesswork out of the difficult decisions involved in controlling project escalation. One is an understanding of the psychology of project escalation. Another is the presence of institutional mechanisms to monitor plans and costs. Finally, managers must be equipped with analytical techniques for cost-benefit analyses so that they will have the hard data on which to base judgments.

## The psychology of escalation

Researchers investigating the psychology of project escalation say that people tend to stick with projects they have committed to, despite indications that the project will not repay further investment.

Barry M. Staw and Jerry Ross, two leading researchers in escalation psychology, divide the forces of escalation in two: those that lead to errors in calculating costs and benefits, and those that create commitment to a failing course of action.

Some of the following psychological factors are at work in calculation errors:

### Systematic underestimation.

Project underestimation may reflect genuine optimism, but it may also indicate a deliberate use of the foot-in-the-door method (trying to gain approval first and discussing true costs later). Still another possibility is that the planner may believe that making an unrealistically low estimate will encourage hard work.

**Overconfidence.** Individuals with high self-confidence feel less compelled to search for critical information, even when faced with difficulties.

**Personal bias.** People cast new information in the mold of their expectations and beliefs. Whatever does not fit the mold is dismissed as irrelevant. Ambiguous data is selectively analyzed.

**Selective blindness.** The true costs of a project may be ignored because they lack salience or relevance to the decision maker, compared with the perceived glory of its completion.

**Lack of accountability.** Sometimes individuals stand to gain more from small successes than they would lose from larger failures.

Even when a project manager recognizes that a development effort is out of control, he may persist for a number of reasons. Some of the following forces can entrap an individual in a course of action leading to failure:

**Self-justification.** Maintaining self-image by defending a prior decision.

*Continued on page 66*

# SIEMENS

**"We doubled our print capacity and reduced paper costs by 60%, thanks to the printer professionals"**

"Bright Banc is one of the largest and fastest growing banks in Texas. Headquartered in Dallas, with 45 branches throughout the state and plans for spectacular future growth it's no surprise that the demands on our data processing department are staggering.

We produce 35.2 million pages a year, 50 different forms and reports. And we process a minimum of 25 nights a month.

So, when I was charged with increasing data processing productivity, I knew the solution was laser technology. The question was...whose laser printers?

We spent months weighing the alternatives...analyzing our existing impact printers...other manufacturers...and Siemens. We measured speed. Reliability. And above all cost. And when all was said and done, the choice was clear.

We could install Siemens Laser printers for less than it

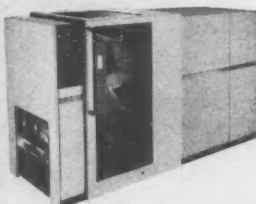
cost to run our existing impact printers, 22% less than the competition. And we could cut our paper costs by 60%. To print a 1,000 page report on impact printers we'd have 1,000 3-part sets - with a paper cost of \$30. With Siemens laser printers each copy is an original...and paper cost only \$13.

Now, with Siemens high-speed laser printers our print quality is higher than ever, we never miss a deadline, we can expand without increasing costs...and we keep more of our money where it belongs...in the bank. And that's a 'Bright' idea."

*J. Hill*

**Jim Hilbun**  
Senior Vice President  
Director of Production Services,  
Bright Banc

## High-speed laser printing systems



Contact the Printer Professionals at:  
**Siemens Information Systems, Inc.**  
Peripheral Systems Division  
240 East Palms Road  
Anaheim, CA 92805  
(714) 991-9700

CC3030-020A WLM 89

# What you didn't know is that we now have an advanced SQL/RDBMS that does things other databases don't do.

Introducing PowerHouse  
StarBase™—a fully relational, SQL  
database specifically designed for  
high volume, multi-user transactions.

PowerHouse StarBase sets new  
standards for distributed processing.  
It features referential integrity, con-  
currency controls and two-phase  
commit which guarantees data  
integrity. Triggers allow you to write  
business rules *within* the database.  
What's more, it enables you to  
manage large, complex datatypes  
(BLOBS).

Best of all, PowerHouse StarBase  
integrates tightly with hardware  
architectures. And it works with the  
full PowerHouse development tool  
set *in concert with your existing file  
structures and applications.*

**COGNOS®**

## Escalation

FROM PAGE 64

**Face-saving.** Reluctance to admit mistakes to others often pushes people to delay, hoping that problems will solve themselves or that everyone will forget who is responsible.

**Distaste for quitters.** Perseverance and consistency are valued personal and leadership traits that present a mask of confidence and stability.

**You are your work.** The individual and group become associated with the project. Project termination is equated to both personal and group failure.

**The naysayer stigma.** Projects happen because somebody has enough vision

and drive to gain support and get resources committed. Championing project cancellation is perceived as the antithesis to this highly desirable behavior.

**Institutional inertia.** Changing directions can be difficult in any environment. Project changes set off a cascade of related alterations, potentially including unpopular ones such as staff reductions.

**Preserving the investment.** It may be felt that, if a project is not finished, all the money already spent on it will go down the drain.

**Competition.** If rivalry exists with other development units, withdrawal may be counted as a loss in the competition.

**Political promises.** Projects often develop alliances and political constituencies with independent expectations.

Understanding the psychology of escalation can help you properly manage projects that might otherwise drift out of control, but it is not a full solution. Proper control also requires institutional safeguards and objective techniques both at key review points and as part of the routine business of management.

### Ensuring realistic appraisals

Properly designed cost- and management-accounting policies can draw attention to escalation before it becomes a major problem. Cost-accounting measures address the need for accurate and consistent information on costs. Management-accounting requirements help establish the ground rules for resource use and unit interaction. Together, they help to en-

sure realistic project appraisals.

An example of the available powerful escalation control device is zero-based budgeting, whereby each project must be fully justified during every budget period and approval must be obtained to gain additional resources for any project.

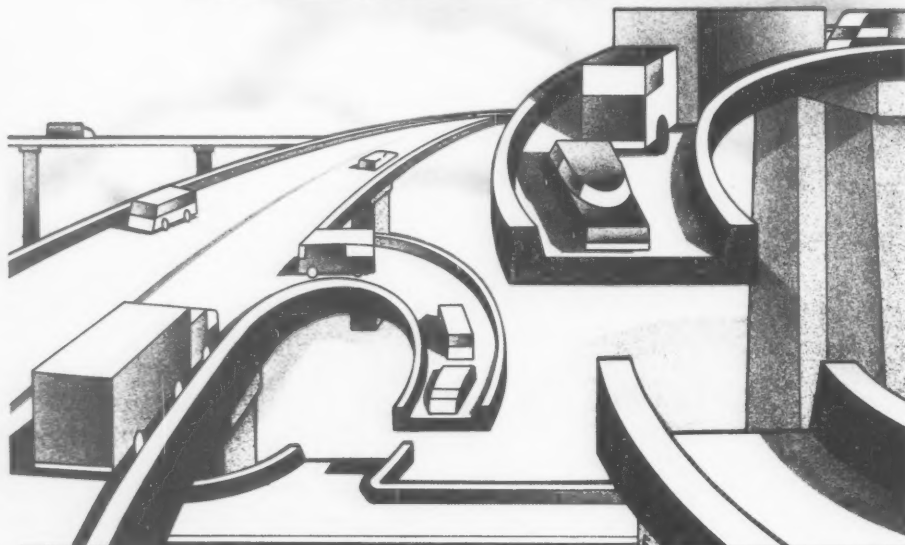
There are three kinds of critical review points in the project life cycle. The first is at scheduled milestones. The second comes whenever there is an increase in controllable project costs beyond what can be explained as a normal factor of inflation. The third is at any point at which the project changes from the baseline of the original plan.

Usually, an informal cost-benefit analysis will suffice. However, a formal analysis can be a bargain when intuitive judgment is most likely skewed by escalation psychology, or when sound analysis must be communicated or "sold."

Standard project management wisdom holds that management and individual commitment are central to the success of IS development projects. Unfortunately, too much of this good thing can transform a routine minor miscalculation into a memorable disaster.

Understanding escalation from both psychological and economic perspectives supports better, more objective decisions. Interpreting escalation from the point of view of the decision maker, rather than from that of an abstract project bottom line, reveals the real motives for many project decision escalations. •

## DON'T GET STRANDED AT THE NETWORK INTERCHANGE



**Without the right connectivity solutions, your business might be heading for a dead end.**

Connect '89 will provide users and vendors with innovative solutions to the complex problems of managing a company's information network.

At this 3-day Conference and Exposition, you will see and hear what leading manufacturers are doing to provide better integration, architecture, distribution, marketing and service.

You will learn how software and networking are replacing hardware as the major factors in connectivity, and how this development will impact acquisition decisions. You will hear how OSI (Open Systems Interconnect) and UNIX will be critical to the future of information systems architecture. Recognized experts also will lead important discussions on the future of "Interoperability" and its potential for helping to ensure consistency across different computer systems.

In addition, Larry DeBoever and Dale Kutnick, two of the foremost industry authorities on connectivity, will conduct a strategic symposium that will focus on five year connectivity plans and future architectures for software networking and asset management.

If you can't afford to fall behind in system connectivity, you can't afford to miss Connect '89.

For more information about Connect '89, call (203) 964-8287.



**Connect '89**

THE TECHNICAL CONFERENCE AND EXPOSITION  
FOR THE BUSINESS COMMUNICATIONS PROFESSIONAL

April 18-20, 1989  
Boston World Trade Center  
Commonwealth Pier  
Boston, Massachusetts

**SAVE \$10 ON SHOW  
ADMISSION**

Bring this ad to Connect '89  
and pay only \$25 admission  
to The Exhibition and  
The Conference.

Without this ad admission is \$35.

(Strategic Symposium requires separate registration).

## Ongoing projects

The methods used to analyze continuing projects are similar to those used for cost-justifying new projects. Most aspects of standard cost-benefit analysis apply, such as valuing future income less than current income and estimating risk.

An effort must be made, however, to count only future costs and projected benefits, disregarding committed investments and realized benefits.

The basic evaluation process involves the following actions:

- Analyze the benefits of what the completed project is worth from this point on. Count everything; remember that intangibles such as prestige and experience can be valuable.
- Analyze the cost of what the project will cost to finish (from this point on).
- Calculate the net current value of the project as currently constituted, compared with alternative courses of action such as postponement of new requirements, adjustment of project duration, abandonment in favor of other projects and termination or suspension of the effort. Net current value is the expected return for the total investment, adjusting the time value of future income to current value.

RICHARD ORLI



You also may not realize  
how thoroughly we support  
the data management  
environments you've already  
invested in.

We know that your organization has made significant investments in hardware, hardware vendor databases and probably even 3rd party databases.

That's why we integrate so tightly with hardware vendor databases. It's also why we intend to bring to common 3rd party databases the same high degree of functionality PowerHouse brings to native file structures. It's the reason we're releasing our first UNIX<sup>®</sup> product. And it's why, in the coming months, we'll be releasing our solution on the AS 400<sup>™</sup>.

It's simple. As you strive to get ahead, *we don't want to see anything get left behind.*

**COGNOS<sup>®</sup>**

## Merrill Lynch finds the key to control lies in accountability

BY ALAN RADDING

With an annual budget of \$155 million for software development, it is hard to imagine that Merrill Lynch & Co. would have to be concerned about keeping a lid on costs. But, as any monied person will tell you, as the resources increase, so do the demands.

There are currently 247 application development projects under way just within the company's Advanced Office

Systems Group, which supports field offices with front-end systems for financial consultants. With that much going on, the demands on resources are tremendous and the need for tight controls is great.

Two years ago, the company decided to take action to control spiraling development costs in those groups. According to Greg Toutoundjian, project manager of planning and business support, the primary goal was not necessarily to reduce costs but to ensure that the systems the

users were getting were worth the money it took to develop them.

The Advanced Office Systems Group took the first step toward value-based control of development costs in 1987, when it started using Multitrak, a mainframe-based development project planning and monitoring system from Boston-based Multitrak Software Development Corp. The software monitors the progress of system development efforts and compares a project's ultimate cost, as determined by the actual reported expenditures of resources, with the budgeted cost. The system, which provides detailed weekly project-by-project schedule and budget analyses, automatically flags a project when it is going over budget or falling behind schedule.

The success of any project management control program relies on assigning responsibility and accountability and building in an incentive to ensure that participation in the program is self-motivating. So, as an added control measure, the Advanced Office Systems Group instituted a more centralized system of charging back development costs to the end-user departments earlier this year through a department-level monitoring program called the Project Analysis and Reporting System (PARS) program. PARS is a companywide financial-tracking system that relies on monthly activity summaries detailed only to the department level.

By using a charge-back system, the Advanced Office Systems Group is accomplishing two things: It is adding to the accountability of the project management team and transferring fiscal responsibility to the user.

Every project is tied to a sponsor who is charged for the development, according to Toutoundjian. MIS comes up with a budget for a proposed project and the sponsor can either approve or reject it. Sometimes sponsors



Merrill Lynch's  
Toutoundjian

are surprised when they see exactly what their request is going to cost. "It's a bit of a shock," Toutoundjian says.

The Advanced Office Systems Group charges sponsors on the basis of an annual salary and overhead rate of \$105,000 per MIS employee. "At that rate, the cost of a project can quickly add up," Toutoundjian notes.

A major advantage of full charge-back, he says, is that if a user is apprised of the costs and still wants to take sponsorship responsibility, then he will become a partner in helping to control costs and guarantee successful completion.

Responsibility and accountability both come into play when a project goes over the approved plan by 15%. If that occurs, the MIS project manager must return to the project sponsor to obtain additional funding or get approval to shift resources from another project. The sponsor can decide to pull the plug on the project, Toutoundjian says, although that happens infrequently. Problems are usually caught early enough to allow for adjustments.

There have been pockets of resistance to the cost-control initiatives, particularly to Multitrak's automated control system. Project managers, for example, balked at having to do their project planning on the system. Toutoundjian admits that going to an automated system was a lot to absorb in a short time and says he soon discovered it was best to let the managers acclimate themselves to the system by first using it for project tracking.

One advantage of having project managers use a system such as Multitrak, Toutoundjian says, is that because the managers provide the project data, they cannot challenge the progress reports.

In spite of the adjustment problems, the department is already seeing a payoff. Sponsors "are taking greater care laying out the specs," Toutoundjian notes, and managers are planning more carefully. ♦

Radding is a Newton, Mass.-based author specializing in business and technology.

Tandy® Computers: The broadest line of PCs in America.

The  
Tandy  
1400 LT



The affordable  
MS-DOS®  
based laptop  
computer.

Here's a laptop computer that's a true IBM® PC compatible. With a removable, rechargeable battery pack built in, the Tandy 1400 LT is perfect for people on the go—like busy executives, sales personnel and journalists. Or you can use it like a desktop computer.

The Tandy 1400 LT features a high-resolution backlit liquid crystal display. The 80-character by 25-line resolution gives you the same quality of display as a full-sized monitor. And it's

remarkably clear, thanks to the latest in "supertwist" LCD technology.

The 8088-equivalent microprocessor has a 7.16 MHz clock speed (vs. 4.77 MHz for other PC-compatible portables). Standard equipment includes two 720K 3½" built-in disk drives and 768K RAM—ample memory to run today's powerful MS-DOS based programs.

The Tandy 1400 LT also includes a parallel printer adapter, RGBI color monitor output, a real-time clock and

an RS-232C serial interface. You even get MS-DOS 3.2 and GW-BASIC.

Come to your local Radio Shack and see the Tandy 1400 LT. (25-3500)

Send me a 1989  
RSC-20 computer catalog.

Mail to: Radio Shack, Dept. 89-A-775  
300 One Tandy Center, Fort Worth, TX 76102

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
ZIP \_\_\_\_\_ Phone \_\_\_\_\_

**Radio Shack**  
The Technology Store™

A DIVISION OF TANDY CORPORATION

Tandy Computers: Because there is no better value.™

MS-DOS/Reg. TM Microsoft Corp. IBM/Reg. TM IBM Corp.

# The first PowerHouse application you should develop is this one.

There's no better way to gain a more thorough understanding of the PowerHouse solution than by attending a PowerHouse seminar. And we've made that very easy to do. Because we've scheduled seminars in many metropolitan areas. We look forward to seeing you at one.

Now you're thinking strategically.

**COGNOS®**



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 9 NEW BEDFORD, MA 02780

POSTAGE WILL BE PAID BY ADDRESSEE

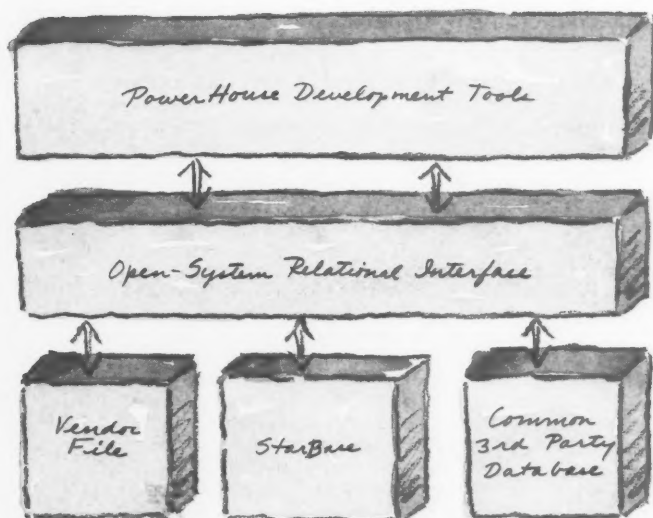
**Cognos Seminar**

P.O. Box N-1098  
New Bedford, Massachusetts  
02746-9961





# Maybe what we should have said is: to succeed today, you need a powerful, flexible, economically sensible, distributed data management strategy.



*The PowerHouse Distributed Data Management Approach.  
A powerful integrated environment that gives you freedom of choice.*

That, in a nutshell, is the strength of the PowerHouse solution. A distributed data management environment that offers you unparalleled performance, flexibility and freedom.

Unlike common database approaches, which chain you to a captive environment, the PowerHouse solution acknowledges a simple, salient business fact: you've spent time and money getting to where you are today. Far from expecting you to abandon your current applications, our solution

preserves and enhances the investment you've already made in hardware and software.

The PowerHouse solution also acknowledges a simple, salient computing fact: environments today are likely to be a mixture of different hardware platforms, different operating systems, different databases, different data sites. The beauty of PowerHouse is that it works with and, even more importantly, helps you integrate the disparate elements that make up your computing world.

With the PowerHouse solution,

you get powerful 4GL development tools with links to CASE products, spreadsheet programs, IBM mainframes and PC LANs.

With the PowerHouse solution, you get flexible database options—options that bring cohesiveness to native file structures and will enhance the performance of 3rd party RDBMSs. And with PowerHouse StarBase, you get advanced distributed database performance that far exceeds industry norms.

With the PowerHouse solution, you get a comprehensive program of consultation, education and support. (Not to mention access to over 300 existing vertical applications written by independent PowerHouse Partners.)

The PowerHouse Distributed Data Management Environment. A strategic solution to the challenge of managing information in a world that can sometimes seem to border on the chaotic.

If that's the kind of world you need to manage, phone us at 1-800-426-4667. For information on our seminars, call 1-800-548-6750\*.

Now you're thinking strategically.

**COGNOS®**

\*In Canada, call 1-800-267-2777. In Europe, call +44 344 486668.  
Cognos Corporation, 2 Corporate Place, 195, Peabody, MA 01960. Cognos Incorporated, 3755 Riverside Drive, P.O. Box 9707, Ottawa, Ont. Canada, K1G3Z4  
Cognos and PowerHouse are registered trademarks of Cognos Incorporated. PowerHouse StarBase is a trademark of Cognos Incorporated. Other trademarks are the property of the respective trademark holders.

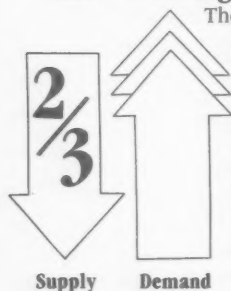
# A few important tips on recruiting computer professionals

**F**inding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so have the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

## The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher now and into the '90s.

## Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who



would consider new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

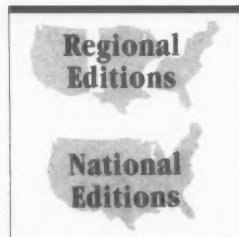
## More job seekers see your ad in Computerworld than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals *expect* to see the most jobs every week.

## Computerworld gives you regional editions

A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.



## Computerworld needs just 3 working days for your ad to appear

That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

## Computerworld costs no more than local papers

And with a regional line rate of just \$9, your cost-per qualified candidate reached is better than *any* newspaper — Sunday, daily or trade. Or just about any other source, for that matter.

## Computerworld leads candidates to your ad

Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive or active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.

And while times may change, some things won't. Whether you *use* computers, *make* computers, or sell products and services for computers, *Computerworld* is still your major source of news today. And your major source of computer professionals tomorrow.



For more recruiting tips, call John Corrigan, *Computerworld's* Classified Advertising Director, at 800/343-6474 (in MA, 508/879-0700).



**Weekly. Regional. National.  
And it works.**

For every 10 of today's computer job seekers...	
2 are Active	■ ■
7 are Passive	■ ■ ■ ■ ■ ■ ■
1 is a Non-mover	■

# IN DEPTH

## Charting a safe course to systems integration

*What to do when projects careen off track or fail to live up to promises*

BY DANIEL W. GASKILL

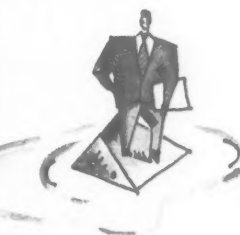
**S**ystems integration will be the biggest technical challenge facing information systems organizations over the next decade. Because of their size and complexity and the large dose of attendant risk, systems integration projects differ from the small-

Gaskill is a product manager with Holland Systems Corp., a computer-aided software engineering products and services vendor in Ann Arbor, Mich.

er, more completely understood software applications that have traditionally been undertaken by IS. They also differ because of their strategic importance to the organization. But in many ways, managing them is similar to managing any project that implements a technology new to the IS organization and to the company as a whole.

Simply put, systems integration is all about delivering the right information to the right person at the right place and time. Chief executive officers in many companies are realizing that achieving this straightforward goal can have an enormous impact on their organization's ability to accomplish its objectives. Achieving a successful systems integration, however, is anything but straightforward, as anyone who has ever been involved in such a project knows.

By its very nature, systems integration implies something



difficult. It implies making complex technologies work together in untried ways and linking people and machines together through the use of information technology in order to further the goals of the organization.

These projects often include complex requirements for distributing information or for linking disparate organizations through the sharing of data. And if these complexities are not enough, the very size and ambition of such projects can subject them to organizational politics and infighting.

Whether systems integration projects are performed internally or contracted out, IS usually bears responsibility for managing them. Their strategic importance places enormous responsibility on the IS manager to understand the business better and to provide systems that contribute to the organization's success.

### It's not the technology

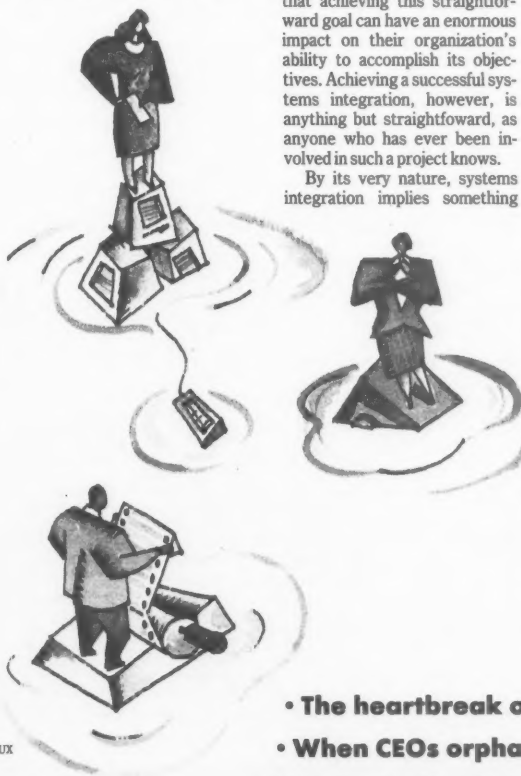
When systems integration projects go awry, people and organizations — not technology — are most often the cause. Although

the symptom of a problem is usually a technical failure, the failure is often not the result of a technical impossibility. Therefore, IS should be able to recognize the most common pitfalls that await large systems integration projects and deal with them in ways that substantially reduce the risk of failure.

Three of the most common problems plaguing today's systems integration projects are the following:

- Conflicting, poorly defined or wildly fluctuating requirements.
- Insufficient application-domain knowledge on the project team.
- Communication bottlenecks and lapses.

Since the solutions to these difficulties usually require management action, it is particularly important that IS managers are



ROBIN JAREAU

- The heartbreak of analysis paralysis
- When CEOs orphan their brainchildren
- Communication breakdowns within teams





aware of the problems and familiarize themselves with the various approaches to addressing them.

Many systems integration projects start out as the brainchild of a powerful senior executive in the organization; often, it is the CEO. However, the brainchild can be orphaned almost as soon as it has been conceived. This happens when the task of requirements definition is put in the hands of an IS manager several steps down the ladder who has little or no access to the idea's originator and only a vague understanding of where to go with it.

Such was the case when a major manufacturer in the Midwest had to abandon an employee compensation and benefits administration system after nine months of requirements analysis because the system's functional scope was never properly established.

Without clear direction, project scope can be manipulated by every powerful user who gets involved in the requirements process. The end result is usually either a project that is too vast for the resources at hand or one that suffers from analysis paralysis because no one is sure where to draw the line.

#### Get it down on paper

The key to successful requirements definition is a project charter or mission statement and the establishment of a project steering committee.

The project charter spells out, in a short space, the purpose and scope of the project and the organizational goals and objectives that will be served by a successfully implemented system. This brief but crucial document should be put together by the executive who is championing the project.

Because most systems integration projects are large enough to cross the boundaries of organizational units within the enterprise, key executives in the units that will be involved in the project need to approve it. This approval can be obtained by having these key people sign off on the project charter.

Their continued involvement is nearly guaranteed by also asking them to participate in a steering committee for the project. The function of the steering committee is to allocate resources for the project, identify user representatives, monitor progress and approve project deliverables. Including a high-level representative from IS on the steering committee ensures that the technical perspective will be represented.

A steering committee, apart from providing project control at a high level, spreads political risk and political gain—and, in doing so, helps to depoliticize the project. Although the committee's time commitment to the project will be low, the members' continuing involvement ensures necessary managerial support throughout the duration of the project.

The very act of putting together a mission statement and a steering committee for a systems integration project seems to bring these large undertakings into focus. In fact, if a sense of purpose and direction is not achieved, it will be evident in an ill-defined mission statement, and the key executives who are the would-be steering committee participants will not give their approval from the outset.

Fortunately, this process can nip a disaster in the bud before millions of dollars have been spent. If a clear mission statement and cohesive steering committee do

## A CLEAR MISSION statement and cohesive steering committee will provide a source of motivation and a sense of direction to the project team.

emerge, they will provide a source of motivation and a sense of direction to the team assembled to work on the project.

#### Project deliverables

One of the first actual project deliverables is, of course, the requirements document. IS should use the aforementioned charter as a constant reminder of the project's scope and purpose during the requirements definition phase. This process helps both the user representatives and

the requirements definition team develop a concept of the "total system," which is essential not only to a well-formulated requirements document but also to a well-designed system. Nothing motivates a project team more than a clear sense of the ultimate value of the project and the belief that the target is achievable.

The role of the steering committee in requirements definition is to resolve interpretation conflicts and to hold the line on pressures to change the scope of the

project as it has been documented in the charter. The steering committee's previous commitment to the charter and its growing identification with the project provide incentives to prevent the requirements definition process from getting out of hand.

But while a clear project charter and a steering committee smooth the initial requirements definition phase, they do not eliminate pressures to change requirements during subsequent phases.

In the best of all possible worlds, the systems integration project team would start with a complete and clear requirements specification, and they would be able to hold the environment constant long enough to get the project completed as it was originally specified, thereby

## U.S. Companies Involved In ISDN Trials And Service Rollouts

Company	Switch	Access	Carrier	Status	Note
Aetna, Hartford, Conn.	AT&T SESS	Basic	Southern New England Telephone	Installation underway	
American Express, Phoenix, Ariz.	AT&T System 85 PDS/SESS	Primary	AT&T	Started July 1989	First customer of AT&T's Primary Rate.
American Telephone & Telegraph, Jacksonville, Fla.	AT&T System 85 PDS/SESS	Primary	AT&T	Started Dec. 1987	State test site for AT&T's Primary Rate.
Arizona, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1988, officially ended	
Bosling Co., Seattle	AT&T SESS	Basic	US West Communications	Scheduled start Nov. 1989	
Carnegie Mellon University, Pittsburgh	AT&T SESS	Basic		Contract pending	
Chenoweth Corp., San Francisco	Northern Telecom DMS-100	Primary/Basic	GTE South	Installation underway	
Centel Corp., Atlanta	AT&T SESS	Basic	Southern Bell	Started April 1989	Paying customer
Central State Corp., Minneapolis	NEC NEAX 61E	Basic	US West Communications	Started Nov. 1987, ends Nov. 1989	Test
Duke University, Durham, N.C.	AT&T SESS	Basic	Southern Bell		
Eastern Bell, Rochester, N.Y.	Northern Telecom SL-100 PDS	Primary		Started Aug. 1989	First Primary Rate using two SL-100s.
Federal National Mortgage Assoc., Washington	AT&T SESS	Basic	CAP Telephone	Started June 1989	
First Bank International, Inc., Springfield, Mass.	AT&T SESS	Basic	US West Communications		
Globe Inc., Research Triangle Park, N.C.	SL-1 PDS and DMS-100	Primary/Basic	GTE South	Started June 1989	First Primary Rate/Basic Rate in one test.
Henderson, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Comcast Telephone	Scheduled start Jan. 1989	
Hewlett-Packard Computer Products Inc., Norcross, Ga.	AT&T SESS	Basic	Southern Bell	Started April 1989	Using ISDN to develop ISDN products.
Hewlett-Packard Computer Products Inc., Norcross, Ga.	AT&T SESS	Basic	Pacific Bell	Sept. 1987 to Sept. 1989	1988 includes ISDN satellite transmission.
Hewlett-Packard Information Systems (formerly E.D.I.), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included database transmission between office and employees at home.
IBM Corp., Chicago, Ill.	AT&T SESS	Basic	US West Communications	Started Feb. 1989, ends Aug. 1989	Test.
Johns Hopkins Medical Center, Baltimore	AT&T SESS	Basic	CAP of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif.	AT&T SESS	Basic	AT&T Federal Systems		
Lockheed Martin and Space Co. Inc., Sunnyvale, Calif.	AT&T SESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1989	Test.
Mesa, Institute of Tech., Cambridge	AT&T SESS	Basic		Scheduled October Oct. 1989	Using AT&T SESS as PBX for private network.
Naval Air Force Base, Sacramento, Ca.	AT&T SESS	Basic	AT&T Federal Systems	Started Aug. 1989	Model for ISDN deployment at 50 bases.
McDonald's Corp., Oakland, Ill.	AT&T SESS	Basic	World Tel	Started Dec. 1988	
McDonald's Corp., St. Louis	AT&T SESS	Primary	AT&T	Unannounced	
Motorola Inc., Norwood, Mass.	Northern Telecom DMS-100	Basic	New England Telephone	Installation underway	Part of center contract.
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Rhode Bell	Planning stage	
NASA, Washington	AT&T SESS	Basic	AT&T Federal Systems		
Nico Corp., Ogden, Utah	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN.
North Carolina State Univ., Raleigh	Northern Telecom DMS-100	Basic	Southern Bell		
Northeast Utilities, Hartford, Ct.	Northern Telecom SL-1s	Primary			PBIs in Rocky Hill Ct. and Meriden, Ct.
Pennsylvania, State of, Harrisburg	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Statewide network with ISDN in Harrisburg.
Prest & Whitely, East Hartford, Conn.	AT&T SESS	Basic	SNET		
Prime Computer Inc., Hald, Mass.	AT&T SESS	Basic	Southern Bell	Started April 1989	Paying customer.
Rodwell Communication Systems, Richardson, Texas	AT&T SESS with two variants	Basic	Southwestern Bell	Scheduled start Dec. 1989	40 buildings in a campus environment will be linked via ISDN.
Schlosser Leasing System Inc., New York	AT&T SESS	Basic	New York Telephone	Started June 1989	Part of 5,000 line system contract.
Shell Oil Co., Houston	AT&T SESS	Basic	Southwestern Bell	Start Sept. 1989	Plan to use 5,000 ISDN lines.
Southern Methodist University, Dallas	Stroms EWED	Basic	Southwestern Bell	Started Feb. 1989	
Stanford Service Corp., Atlanta	AT&T SESS	Basic	Southern Bell	Started April 1989	Paying customer.
IBM Corp., St. Paul, Minn.	AT&T SESS	Basic	Southwestern Bell	Started Aug. 1989	Plan to use 3,195 ISDN lines.
Thomson Inc., Houston	AT&T SESS	Basic	Southwestern Bell	Started June 1989	Plan to use 3,300 ISDN lines.
Thomson ADL University, College Station	GTE 600-4-5-6-8	Basic	GTE Southwest		
University of Arizona, Tucson	AT&T SESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T SESS as PBX in private network.
University of Connecticut, Storrs	AT&T SESS	Basic	SNET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
University of Maryland, College Park				Unannounced	
University of South Florida, Tampa	AT&T SESS	Basic	GTE South	Started Oct. 1987	
U.S. Dept. of Treasury, Wash.				Contract pending	
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Test.
Virginia, State of, Richmond	AT&T SESS	Basic	CAP of Virginia	Started April 1989	
West Virginia University, Morgantown	AT&T SESS	Basic	CAP of West Virginia	Scheduled start Dec. 1989	Plan to use 600 ISDN lines.

Note: This chart was compiled by CommunicationsWeek with information provided by Telecommunications Inc., Easton, N.J., as well as from news releases and published reports. Carriers, switch manufacturers and their affiliated laboratories are not listed.

64 COMPUTERWORLD



ensuring the intended fit between the system and the environment.

However, in our less-than-perfect world, requirements documents are rarely complete, and the business environment — affected by government regulation and deregulation, global competition and economic fluctuations, technological change and so on — refuses to stay the same.

Thus, systems integration project managers must learn to cope with changes to requirements as a matter of course, injecting some flexibility into the implementation process without bowing to every whim expressed by enthusiastic users.

Changing requirements after the requirements definition phase, while some-

times a necessary evil, is best controlled through a formal process. Users often underestimate the effort required to reengineer systems, particularly systems that already push the limits of technology. A formal change-review process will insulate the design team from what might be unrealistic user requests.

The project charter enables the project manager to evaluate all requests to change the requirements against the basic statement of purpose. Any request for a requirements change that is inconsistent with the original purpose and goals of the project may indicate a change in the fundamental reasons for performing the project. Such a change could have serious implications for the ultimate success of the project, because it may mean uncer-

tainty among the project's sponsors as to their true priorities.

If priorities have, indeed, changed, then the steering committee must make a decision about whether to halt the project and rewrite the project charter or to discontinue the project altogether. If the first route is taken, the requirements definition phase must be revisited in order to make the requirements document consistent with the new priorities.

Those requests for changes that do support the original intent as expressed in the charter must be considered legitimate, because they will contribute to the ultimate success of the system. Each legitimate requirements change request must be carefully evaluated for its impact on the project's budget and schedule as

well as for the capabilities of the technology that will be used in the implementation. These effects must be identified for the project steering committee, which must make the final decision on whether to go ahead with the change or not.

#### Expertise shortage

The second potential problem in systems integration projects is a shortage of application skills or knowledge expertise. Systems integration project teams are expected to understand how complex systems would behave under extreme conditions — for example, an airplane landing at an airport during peak traffic hours, an assembly line with machines running at different speeds or a patient-monitoring system operating during a heart failure. The system may require complex analytical capabilities such as those required to evaluate a credit application or determine the correctness of a complex factory order.

In addition, unusual communications requirements may be necessary, as in the example of a national retailing chain's need for a satellite link between its stores and a central computer to approve a purchase on credit within a 10-second response time.

Systems integrators — whether internal or external — are expected to combine sophisticated knowledge of the application domain with technical knowledge of data structures, algorithm design and data communications. Also important is an understanding of how humans will work with the system. Obviously, individuals who possess both expertise in the application area and the required breadth of technical skills are rare. Yet this combination of technical and application knowledge is needed to develop a system design that maps the operational characteristics expected by the system's users into the technical and computational structures that will implement the correct operations.

It is not always immediately obvious when an internal project team does not possess the required level of application domain knowledge. This was the case when a lack of understanding of battlefield environments led one defense contractor to build a computer model based on the wrong set of assumptions. The system worked well and was easy to use but gave results that were off by an order of magnitude. Obviously, severe problems can arise when application knowledge is inaccurately applied to a systems integration effort.

On most successful systems integration projects, one or a few individuals should possess the necessary combination of sophisticated technical knowledge and application expertise. Such individuals can have a very positive impact on projects by transmitting application knowledge to other team members and assuming primary responsibility for systems design. Their superior application knowledge and design skill give them a status of "project guru," or expert.

If IS cannot supply individuals with the right combination of application and technical knowledge, it may be necessary to look outside the organization for assistance. Otherwise, the cost and difficulty of learning the application area during the project may become a significant project expense. Under tight schedule constraints, a design team without such a skilled individual as a member may be unable to achieve the integration of

# The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

**95% of ISDN lines are on an AT&T 5ESS® switch.**

AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—95% of non-trial ISDN lines. What's more, we've already shipped over 200,000 ISDN lines for future use. Today, 99 central offices can offer operational ISDN services over the AT&T 5ESS switch, with a total of 415 upgraded with ISDN software.

So, while other suppliers are still in product development trials, AT&T Network Systems is helping phone companies across the nation offer ISDN services right now on today's network. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail all over a single phone line.

**ISDN is just the beginning.**

We believe that ISDN is the beginning of a bigger future. A future we call Universal Information Services. A future where networks can carry voice, data and image into anyone's office or home at any time in any combination, with maximum convenience and economy.

At AT&T Network Systems, this belief is already driving our technology, our product development and our commitment to you.



**AT&T**

The right choice.

© 1989 AT&T

application experience and technical knowledge required to develop a coherent architecture and design strategy.

#### Communications glitches

Large integration projects depend on extensive communication among various parties. The groups that must interact include not only those directly involved in the project — such as the planning and design teams — but users, senior management, quality assurance personnel, vendors and subcontractors, all of whom need to share information and coordinate their activities with the project team.

IS management often incorrectly assumes that the only solution to communication problems is detailed documentation. But critical group interaction cannot

be reduced to the mere exchange of documentation. While documentation is an essential component in project management and development, there are many reasons why it falls short as a substitute for face-to-face interaction.

For instance, textual and diagrammatic descriptions often fail to convey the more subtle aspects of systems requirements. Designers need to understand how a system will be expected to function under a variety of different operational scenarios. Detailed consideration of the myriad operating conditions are usually abstracted out of requirements specifications, and when they are included, the specifications become so voluminous that few have the stamina to read them.

On one factory automation project, not

one member of the design team had read the more than 1,000 pages in the requirements documentation — understandably. But with neither direct contact with the system's users nor a thorough understanding of the requirements document, designers are apt to work from the more obvious scenarios of system function and neglect the cases that users would ultimately want the system to address.

In order to facilitate direct contact between users and designers, the IS manager should assign a knowledgeable user to the project on an as-needed basis. The user representative must know the application area well and be able to identify other individuals who can be tapped for detailed knowledge in specific domains.

Large integration development teams

also face a trade-off between time spent in verbal communication among colleagues and time spent documenting decisions for future project members and each other. Face-to-face encounters are essential in achieving a meeting of the minds and in building team spirit and confidence.

Unfortunately, such meetings are time-consuming and often go through many twists and turns before useful results are obtained. But IS should not abandon the idea without trying additional tactics. For example, on large projects, the use of a scribe can be indispensable in helping to document the process. Creating a database of issues and their resolutions is another helpful strategy.

Many techniques are available for developing and representing system designs. The value of any given technique is highly dependent on the type of system under development and the skill of team members in using the techniques and representation standards for all projects. In fact, it may be necessary to allot some project time for identifying the most appropriate representational tools.

Such an approach would have saved time and money on one project in which the project team, after spending six months trying to develop a logical architecture for a complex, highly interactive expert system using data-flow diagrams, finally abandoned this approach on the advice of an outside consultant.

Once viable representation techniques

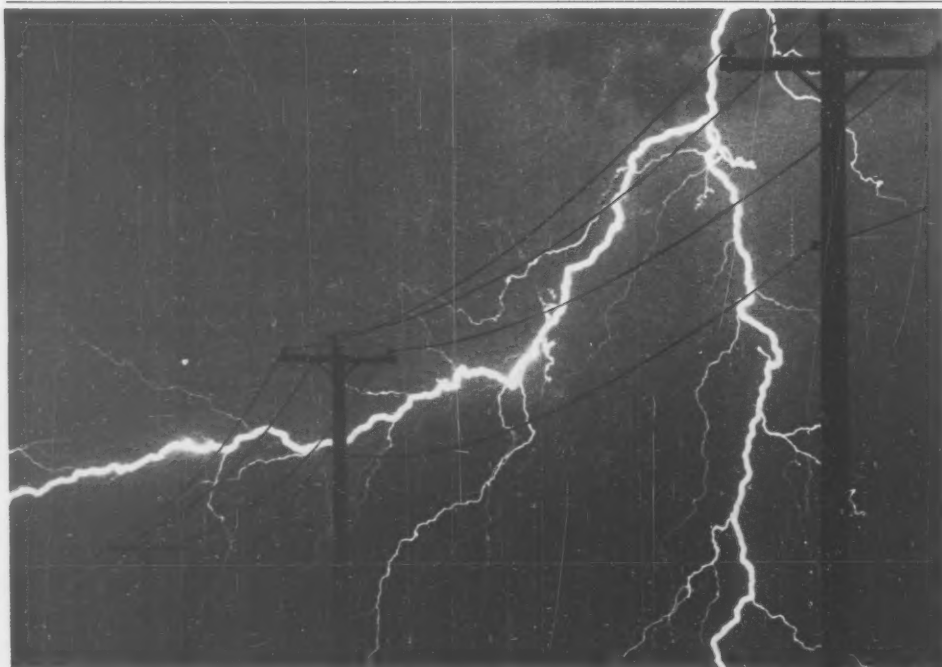


are identified, they become powerful tools for facilitating the discussion of system issues. Rather than providing static documentation, diagrams provide a common language and mechanism for reasoned disagreement and evaluation.

Ultimately, IS can best manage the risks associated with systems integration projects by forming a partnership with senior management that will make sharing the risk possible. There are three important elements in this partnership.

First, senior management must involve IS in business planning, where the relevance and need for systems integration is first determined. Second, IS managers must be fully alert to the potential problems with large projects and completely open with organizational sponsors about them. This calls for a candor that has not always been present in the relationship between IS and executive management in the past. The third element is the ability of IS to recognize when it is overmatched by a particular project or when a new undertaking could dangerously increase the portfolio of risk-laden projects already assumed.

The operative words here are obviously openness and cooperation. In any case, IS should be increasingly careful when trying to chart a safe course through systems integration waters. \*



© 1988 Hayes Microcomputer Products, Inc.

## ERROR-CONTROL FOR FORCES BEYOND YOUR CONTROL.

The hazards faced by your high-speed data can be truly shocking.

That's why, in addition to providing the original V-series™ error-control, Hayes V-series 2400 and 9600 bps modems now offer error-control in either international standard V42 or X.25.\*

The V42 protocol, for point-to-point communications, automatically detects errors and then retransmits the data correctly. While the X.25 protocol not only offers error-control but also multisession access to value added networks with expanding applications for dial-up X.25 point-to-multipoint communications.

V-series modems still provide users with data compression that can double throughput. And Hayes AutoSync for built-in synchronous communications without the added expense of a synchronous adapter card.

All to give you more control. Because with a Hayes, the only error you can make is not buying one.



For your nearest Hayes Advanced Systems Dealer, call 800-695-1225. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348.

\*There will be a minimal charge of \$50 for either an X.25 or V42 upgrade on products purchased before October 1, 1988. Products purchased on or after October 1, 1988 will include either standard as they become available. For details call Hayes Customer Service: 404-441-1617.

**Hayes.**



# This is for everyone who's been tossing around the idea of changing their network.

A network that can't keep up with your company's growth is something you can really lose a lot of sleep over.

Because there's simply too much riding on your ability to move information effectively.

Which is why you should consider Codex for your network.

For more than 25 years, the only thing we've done is networking. We've engineered many of the industry's innovations.

And we've always offered the best service and support of any networking company we know.

To find out how much we know, call 1-800-426-1212 ext. 7212.

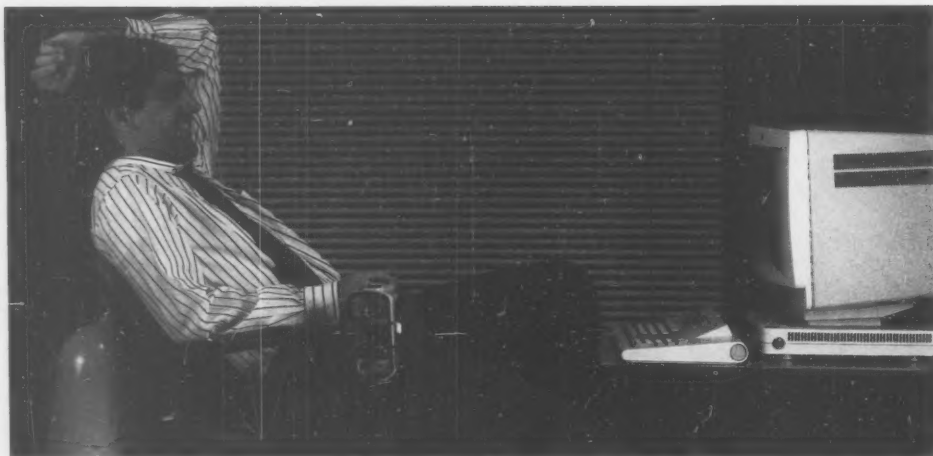
And just think. From now on, instead of spending nights wondering how your network is going to catch up with your organization's expanding needs, you can catch up on something else.

Some sleep. The Networking Experts

**codex**  
 **MOTOROLA**



# Managing DASD Performance Can Be a Pleasure Trip... Not a Survival Course



**DASDMON will revolutionize the way you manage MVS DASD performance.**

Traditional DASD tuning techniques are being out-paced by faster CPUs and increasing user demands for more online data. Although cache controllers, data spaces and hiperspaces will relieve some of the strain, they also create new complexities. Tuning DASD can feel like struggling through a survival course.

**DASDMON takes you away from it all**

**DASDMON** offers you system managed performance today. By cutting through the complexities of conventional tuning, managing DASD performance is more automatic and streamlined than ever before. Once you've set response time objectives, just sit back and...

- **DASDMON** will identify problems by continually measuring individual I/O response times and comparing them to your objectives.
- **DASDMON** will determine the cause of problems by gathering and analyzing data. No longer will you spend hours scanning reports.
- **DASDMON** will present solutions to your problems in precise English, and simulate their effects to ensure that a new problem is not introduced.

- **DASDMON** will select the best possible set of solutions so you can implement recommendations with confidence.

And, if you have any questions or concerns along the way, our experienced technical support staff will be glad to guide you—24 hours a day.

To maximize your system's overall performance, use **DASDMON** with our DASD Performance Optimizers. These products eliminate DASD I/Os, resulting in automatic response time reduction.

For more details, call (800) 323-2600 or (412) 323-2600 in Pennsylvania. Ask for **Extension 333**.

Performance and Optimization products from Duquesne Systems. **Enjoy the results.**



**DUQUESNE  
SYSTEMS**

Two Allegheny Center  
Pittsburgh, PA 15212





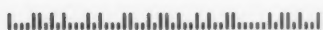
NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 13340 PITTSBURGH, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Duquesne Systems Inc.  
Two Allegheny Center  
Pittsburgh, PA 15212



### Reply today and enjoy the results!

- ☐ Yes, we want more information about DASDMON, a revolutionary software approach to managing MVS DASD performance.

We want more information about the Performance & Optimization products from Duquesne Systems:

- ☐ DASD Performance Optimizers—cost-effective software solutions that counteract delays caused by DASD processing time.
- ☐ NetSpy—a complete VTAM network performance and end-user response time monitor. Available for MVS and VM.
- ☐ BDBF—a comprehensive data center accountability and chargeback system.

Date \_\_\_\_\_

Name \_\_\_\_\_  
(Please Print)

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Operating System \_\_\_\_\_ No. of CPUs \_\_\_\_\_

CW040389

# COMPUTER INDUSTRY

## INDUSTRY INSIGHT

Charles Varga

### Dangerous liaisons



Several relatively disconnected but nonetheless related recent events serve to focus attention on the subject of foreign ownership of the U.S. industrial base, raising some disturbing questions in the process.

Here are some of the events:

- The U.S. government released a list of 22 technologies deemed critical to national security — almost all of which have some information technology component.
- A retired senior military computer security expert, commenting on fallout resulting from the Internet virus affair, said that "the potential for offensive use of viruses is so great that I would have to view the power and magnitude as comparable with that of nuclear or chemical weapons."
- A debate is under way over whether the U.S. government should release R-16 fighter jet software, including the source code of the plane's mission computer, to the Japanese for use in their FSX jet fighter program.

What these events say to me is that for the first time, people

*Continued on page 80*

## Will merger scramble Novell game plan?

### ANALYSIS

BY PATRICIA KEEFE  
CW STAFF

PROVO, Utah — The pending merger announced last month between Novell, Inc., a network software vendor, and Excelan, Inc., a supplier of communications protocols, has raised questions about Novell's off-again, on-again commitment to hardware sales [CW, March 27].

Analysts also questioned how Excelan's focus on penetrating the low end will mesh with Novell's efforts to build bigger, more sophisticated networks. Then there are management issues. Novell is perceived in some quarters to be a one-man show, that man being Chairman Ray-

mond Noorda, while Excelan has endured some turmoil and turnover at the executive level.

In the last six months, Novell first denied, hedged and then admitted to efforts to distance itself from the hardware business. That strategy forced Novell to take a \$10 million write-down in its fourth quarter and also stunted its most recent earnings report.

#### About-face strategy

Asked about the seeming about-face in strategy, Noorda insisted that Novell has backed away only from commodity hardware and defended Excelan's line of intelligent adapters. "Give me a break," one skeptical analyst responded.

How Novell will reconcile Ex-

#### Much to gain

Novell stands to substantially strengthen its protocol portfolio through its pending purchase of Excelan

Standards supported by Novell	
Today	Added through Excelan purchase
• MS-DOS	• OS/2 LAN Manager
• Appletalk File Protocol	• OSI
• OS/2 client	• TCP/IP
• VMS	• Sun Microsystems' Network File System <sup>2</sup>
• Unix <sup>1</sup>	

<sup>1</sup> Unix ports of Network are under development and have been announced

<sup>2</sup> Novell recently signed an agreement with Sun to develop similar expertise

CW CHART: FRANK C. O'DONNELL

celan's hardware with its own stated strategic intent to focus primarily on software, such as its Network network operating system, is unclear.

One former Excelan employee suggested Novell may downsize Excelan, selling off some or all of its hardware business. If so, Mary McCaffery, an analyst at C. J. Lawrence in New York, said she wants to know whether Novell would take another write-down. "That's why the stock is down," she said.

Any effort to spin off Excelan's hardware will be complicated by two factors, the former employee said. Excelan's hardware is closely coupled with its software and also accounts for more than 50% of the company's revenue. Conversely, Novell has espoused a philosophy of hardware independence. About 35% of its revenue is derived from hardware.

It is generally agreed that Excelan will provide Novell with much-needed support for protocol standards vital to competing for corporate accounts. "Exce-

lan's experience [in this area] is going to be key," said Cecilia Brancato, an analyst at Oppenheimer & Co. in New York.

Users will benefit further if Excelan's technical expertise helps Novell bring products to market faster. In addition, Novell gains both additional revenue and an experienced research and development force, Brancato said.

#### Cause for concern

In addition, Excelan's license for Microsoft Corp.'s OS/2 LAN Manager has rival 3Com Corp. more than a little concerned, another analyst said.

"It will cause them to rethink what they've got to this point, and they'll probably look to see what they'll have to do to speed things up to catch up with Novell," the analyst said.

3Com Chairman William Krause said, "We've always maintained that Novell would go through three phases with the concept of an OS/2 server [LAN Manager]: denial, acknowledgment

*Continued on page 80*

## ADAPSO leader resigns

Organization to maintain strategic status quo

BY NELL MARGOLIS  
CW STAFF

For the second time in two years, ADAPSO has unexpected room at the top. However, the mid-March departure of George T. DeBaKey from the office he has held since 1987 in no way alters the strategic direction of the computer software and services industry association, according to remaining ADAPSO leaders.

"The direction we're going in doesn't have much to do with the executive director," said ADAPSO's head of long-range planning, Richard L. Crandall. "It's

likely to be more the other way around."

That direction, Crandall said, is one of "a certain amount of decentralization" in the interest of making the expanding association's sections more responsive to their respective constituencies. Increasing the size of the ADAPSO staff has also moved up in priority on the organization's agenda, he said.

Several industry sources say the appearance of a revolving door at ADAPSO is largely coincidental. DeBaKey's predecessor, Jerome Dreyer, abruptly

*Continued on page 81*

# 1-800-541-BULL.

For the straight story on cost-effective, high-volume printers, there's only one number to call.

We'd like to show you a few numbers that will make you want to call the one above. For starters, a 60 or 90 page-per-minute Bull printer can do anywhere from 200,000 to 2,000,000 pages per month. So whether you're running high-volume data processing or creating electronic forms, you get all the capacity you need for about 1/2 the cost of a comparable laser. And our printers' reliable non-impact technology keeps going when you need it most. Equally reliable is the company behind them. At \$5.2 billion worldwide, Bull is a systems supplier you can count on. But if big numbers don't impress you, we have something else that will. An independent survey on user satisfaction. Call for your free copy today and find out what really counts.

**Bull**  
Peripherals



VMS<sup>™</sup>  
DIGITAL EQUIPMENT CORP.<sup>®</sup>  
OMUNOS220X

UNIX<sup>®</sup>  
OPERATING  
SYSTEM

Registered trademark of AT&T

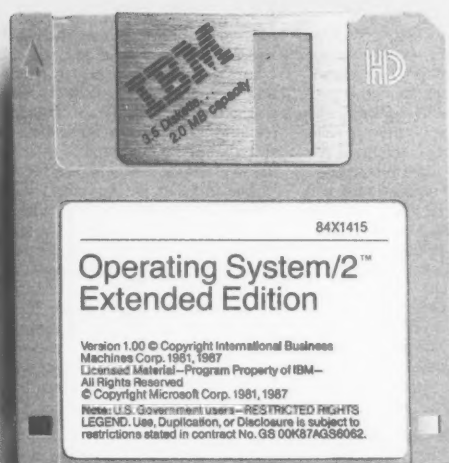
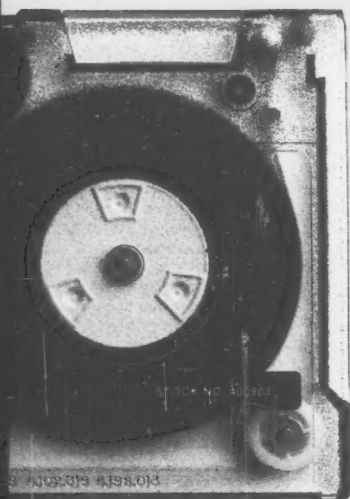
600

MS-DOS<sup>™</sup> 3.3 System D

Copyright Microsoft Corporation, 1982 through 1987

# WE'RE OPEN TO ANYTHING.

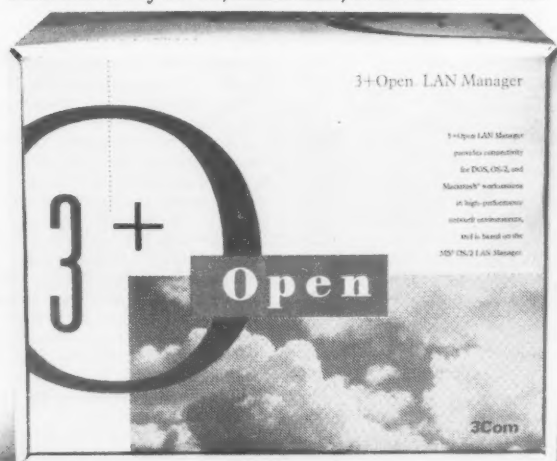




## INTRODUCING 3+OPEN™ LAN MANAGER.

At 3Com, we've developed the first completely open, non-proprietary network operating system.

And the only standards-based, high performance network operating system to ensure connectivity between today's DOS, Macintosh®, UNIX® and IBM® host



systems. While supporting the OS/2 LAN Manager distributed applications to come.

Only 3+Open LAN Manager is based on widely accepted file and network protocol standards supported by Microsoft, IBM, Digital Equipment, Hewlett-Packard and others. To provide a wide range of multi-vendor connectivity.

In other words, 3+Open is remarkably flexible.

It's also incredibly functional. With advanced mini-computerlike capabilities in security and network management. And standard application programming interfaces which allow you to tailor 3+Open to meet your specific needs.

All of which means that 3Com can now network more types of systems to more types of systems than ever before. To learn more, all you have to do is call 1-800-NET-3Com, Dept. CF.

And keep an open mind.

# 3Com

We network more types of systems  
to more types of systems.

## Novell

CONTINUED FROM PAGE 77

ment and then adoption."

Krause said the proposed merger took 3Com by surprise. "Novell has been profusely expressing a desire to divest itself of hardware to become a software company. This seems to be a major change in strategy," he said.

Microsoft officials were to have met with Excelan last week to discuss the license. "The language of the contract could prevent certain information from flowing to Novell," McCaffery said.

Moreover, working with Novell could cost Excelan its OEM relationship with Microsoft. Microsoft may replace Exce-

lan's Transmission Control Protocol/Internet Protocol port for LAN Manager with a competitive product, Krause said.

Further fallout from the merger could damage Novell's relationship with neighbor and Macintosh connectivity development partner Dayna Communications, Inc. Noorda conceded that responsibility for Novell's Netware for Macintosh software will be shifted over time to Excelan's Kinetics subsidiary, which manufactures connectivity products for Apple Computer, Inc. networks. "It's the natural thing to do," he said.

Despite 3Com's alleged surprise, Novell and Excelan maintain that a merger was inevitable. Excelan tried unsuccessfully to merge with Network Equipment Technologies, Inc. last year. The buyout

fell apart after key Excelan shareholders rejected NET's offer of \$13 per share. Novell soothed shareholders by offering a little more than \$18 per share, a premium of about 45% over the stock's closing price at the time of the offer of about \$13, analysts said. "We wanted to make sure this went through," Noorda said.

The terms of the agreement require certain Excelan stockholders, including each of its directors, to agree to vote their shares in favor of the merger. The existing shares of Excelan common stock will be exchanged for newly issued shares of Novell common stock, with Excelan stockholders receiving a minimum of 0.475 and a maximum of 0.6 shares of Novell common stock. The merger will be accounted for as a pooling of interests.

## Varga

CONTINUED FROM PAGE 77

are paying attention and putting their money where their mouths are to protect militarily critical and commercially valuable information assets from being acquired in one form or another. One of the currently prevalent routes out the door for such assets is foreign acquisition of U.S. technology companies.

As most advancing countries move from manufacturing industries and material-based production to knowledge-based production, an equation must be brought into balance. If we are to maintain our lead in U.S.-based information technology, the equation should read: economic security equals information security equals international security.

Computer scientists say that economists do not understand the role of technology in the economic system, particularly technologies that have a cumulative effect and a dual use, in that they serve existing markets but also serve as a basis for developing the next generation.

On the other hand, there are those who would rather foster a globalization of information technology markets, a totally free system of international trade and strategic alliances across many borders.

While market globalization is a general trend, mergers and acquisitions in computer software, services and information processing companies have been clearly cyclical, peaking in years when there was severe weakening of the U.S. dollar against foreign currencies and ebbing when the dollar was too rich.

### Who benefits?

But who really benefits when the quest of international companies for growth and diversification through increasingly accessible U.S. markets leads to foreign ownership of information technology companies?

Some business owners and shareholders have opted for short-term profit now rather than holding out for long-term growth. Many of these it's-a-done-deal, deal-a-minute types beat the drum for globalization and free trade while their immediate thoughts are of the fast buck.

For managers and employees, the prospects are dim. Just as certain microelectronics industry jobs were deemed environmentally or economically unsuitable for domestic operations but fit for offshore sites, so, too, can skilled programming move offshore. Companies based in India can now produce code at a fraction of the cost of U.S. production. The writing is on the wall.

I have seen five kinds of people in the computer industry: those who write code, those who read code, those who make code, those who break code and those who steal code. Actually, there are six. There are those who buy and sell code.

Capital inflow from foreign sources is welcome and necessary. But we must negotiate agreements that protect U.S. interests. An old saying asks, why buy a cow when you only need a quart of milk? My question is, if you sell the cow, where do you go for the quart of milk when you need it? And how much do you have to pay — if you can get it?

Varga, a 20-year computer industry veteran based in Frenchtown, N.J., is publisher of "The Cerberus Report," a study of industry mergers and acquisitions.

## Take the Direct Route to DEC Computing Solutions

You want straight talk and fast answers when evaluating your DEC system needs. DEXPO South 89 is the direct route to 10,000 DEC computing products and ideas. New technologies for VAX, MicroVAX, and PDP-11 systems line every aisle. Find the right connectivity tool, or the best application...and still have time to explore new OS enhancements. Technical experts from over 200 suppliers will help point you in the right direction.

### DECUS ATTENDEES ARE ADMITTED TO DEXPO FREE.

Attend DEXPO and DECUS...see and learn it all during your most productive three days of 1989.

Call 800-87-DEXPO for your V.I.P. Tickets and a Preview of 100+ DEC computing products. (DECUS is not affiliated with DEXPO and requires separate registration).

\*Registered Trademark of Digital Equipment Corp. DEXPO is not sponsored by or affiliated with DECUS. Organized by Exposition International, Inc., 3 Independence Way, Princeton, NJ 08540

CALL TOLL FREE 800-87-DEXPO  
**DEXPO**  
**South 89**  
The National DEC Computing Exposition  
**Atlanta Market**  
**Center**  
**May 9-11, 1989**



**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Show: ☐ Home ☐ Business

Basic Rate: \$48 per year

\* U.S. Only. Canada \$110. Central/South America \$130. Europe \$195. all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E4914-2



**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Show: ☐ Home ☐ Business

Basic Rate: \$48 per year

\* U.S. Only. Canada \$110. Central/South America \$130. Europe \$195. all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E4914-2

1. BUSINESS INDUSTRY (Circle one)
  - 10. Manufacturer (other than computer)
  - 20. Finance Insurance/Real Estate
  - 30. Medicine/Law/Education
  - 40. Wholesale/Retail/Trade
  - 50. Business Service (except DP)
  - 60. Government — State/Federal/Local
  - 65. Communications Systems/Public Utilities/Transportation
  - 70. Mining/Construction/Petroleum/Refining/Agric.
  - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
  - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
  - 90. Computer Peripheral Dealer/Distributor/Retailer
  - 95. User/Other \_\_\_\_\_

(Please specify)

2. TITLE/FUNCTION (Circle one)
  - 15. MIS/DP MANAGEMENT
    - 19. Vice President/Asst. VP
    - 21. Dir. Mgr. Suprv. IS/MIS/DP Services
    - 22. Dir. Mgr. Suprv. of Operations/Planning/Adm. Services
    - 23. Dir. Mgr. Suprv. Analyst of Systems
    - 31. Dir. Mgr. Suprv. of Programming
    - 32. Programmer/Methods Analyst
    - 35. Dir. Mgr. Suprv. QA/QP
    - 38. Data Comm. Network/Systems Mgt.

#### OTHER COMPANY MANAGEMENT

- 11. President/Owner/Partner/General Mgr.
- 12. Vice President/Asst. VP
- 13. Treasurer/Controller/Financial Officer
- 41. Engineering/Scientific/R&D Tech. Mgt.
- 51. Sales/Mktg. Mgt.

#### OTHER PROFESSIONALS

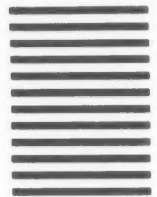
- 60. Consulting Mgt.
- 70. Medical/Legal/Accounting Mgt.
- 80. Educators/Journalists/Librarians/Students
- 90. Others \_\_\_\_\_

(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
  - A. Mainframes/Supremas
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems
  - F. No Computer Involvement



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



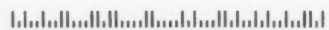
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144





## IN BRIEF

**Up, up and away**

Oracle Corp.'s third-quarter financial report came out last week and does nothing to discourage those who think that "high-flying" is the Belmont, Calif.-based database management system vendor's first name. Chief Executive Officer **Lawrence Ellison** credited the quick takeoff of new applications packages as a major factor fueling the company's 101% revenue rise to \$153.4 million and 84% earnings increase to \$24 million over last year's comparable period.

**Up, up and away, Part II**

Networking systems player **3Com Corp.** has broken the \$100 million barrier in quarterly sales. The company's \$107 million third-quarter revenue total marked a 62% increase over last year's third quarter. Quarterly net income also rose 62%, coming in at \$11 million.

**Tea for three**

Three long-time IBM executives are new vice-presidents of the company. Systems Technology Division President **Robert Corrigan**, IBM Educational Systems General Manager **James Dezell Jr.**, and **Harry Kavetas**, president of IBM Credit Corp., will continue at their current posts.

**Hard times**

National Semiconductor Corp. last week announced plans to close its Danbury, Conn., manufacturing facility this coming February in an effort to match costs to current business levels.

**Bleak house**

Already battling recent losses and a slew of shareholder suits, Longmont, Colo.-based **Miniscribe Corp.** last week announced a financial review undertaken in the wake of new management's decision to curtail or end certain programs and to accept certain products back from distributors claiming excess inventory.

**ADAPSO**

FROM PAGE 77

resigned his office for personal reasons, said Sam Albert, vice-president of Mountain View, Calif.-based market research firm Input, which is an ADAPSO member.

DeBakey's departure, in turn, resulted from the growing diver-

gence between ADAPSO's priorities and DeBakey's own, according to John Imlay, vice-president of image and public communications at ADAPSO.

DeBakey, former assistant secretary for science and electronics at the U.S. Department of Commerce, was brought in from the federal government sector to increase ADAPSO's visibility and public policy partic-

ipation in that area — a mission that he accomplished, Imlay said.

In fact, he noted, "I think George became frustrated. He really wants to focus on the international trade arena, and ADAPSO has a great many interests to serve."

DeBakey has voiced his intent to pursue opportunities in international trade and high technology.

His successor at ADAPSO has not been named. However, Crandall said, "we have a slate of outstanding candidates we're considering." He predicted that the announcement of the new executive director would not be long in coming.

Manning the post in the meantime is Richard Earnest, former president of Reston, Va.-based Systems Center, Inc.

# Come to Singapore

Come and exhibit at the first truly international MacWorld, here in Singapore, the historic meeting place between East and West, the cross-roads of Asian trade routes.

All the big names will be here. The expo is attracting distributors, dealers, VARs and users from every country you can think of. Over 40,000 visitors are now expected in the four days, **29th June to 2nd July**. Don't miss the opportunity to reach half the world at one show.



## MacWorld Expo Asia '89

Please send me your Exhibitor's Pack

Name

Address

City  State

Please post or fax to the office nearest you:

**Singapore Office** 39 Sixth Avenue, Level 2, Mulpha Building, Singapore 1027 Tel: (65) 468 3888 Tlx: RS 26193 ROBOT Fax: (65) 469 8193

**US Office** 1181-B Chess Drive, Foster City, CA 94404 Tel: (415) 341 2227 Tlx: 349 445 TECHNIPOL FTCT Fax: (415) 341 2859

# COMPUTER CAREERS

## Are job fairs worthwhile?

*Scrutinize the sponsors and prepare to seize opportunities*

BY JANET RUHL  
SPECIAL TO CW



"Job fairs are a total waste of time," one MIS professional says. "Non-sense, I got my last job at one," another claims.

Whether or not you will find an MIS job fair useful in landing a new job depends on your understanding of how one works and how you should prepare for it.

Before you decide to go to a fair, spend some time determining who is sponsoring it and what kind of company representatives will be attending.

Some job fairs are sponsored by a single company that is hoping to fill a large number of open jobs — an MIS open house. Some company-run fairs feature booths manned by managers from every department that is looking for staff. Here, if you are interested in a position, you may be able to interview on the spot with someone who has the authority to hire you.

Because a large number of hiring managers attend, it is possible to find out a great deal about the firm's systems — what technologies are most in demand, what pilot projects are under way and what kinds of people succeed in the firm.

A different sort of MIS job fair is sponsored by a vendor that makes money running the fairs. Usually held at a hotel, these fairs feature from 20 to 100 booths, each with one or two representatives from a company. They may be MIS managers or personnel department staffers. Because one or two of them must represent all the open jobs in the company, they may not be able to provide you with details on projects or what exact skills the company is seeking.

However, these vendor-sponsored fairs often include representatives of out-of-town companies that local systems professionals may not realize are hiring.

### Lining up its ducks

Most fair attendees agree that the least satisfying gatherings are ones where the majority of hiring companies are recruiters and contract programming houses. These companies may not have any jobs to fill and are merely keeping track of potentially available workers. Since most job fairs advertise the names of the firms that will be attending, scrutinizing the mix might save you wasted time.

Whether you will accomplish more by going to a job fair than mailing your resume to personnel departments depends on the

skills of the representatives you meet. Their technical expertise, knowledge about their company and interviewing skills vary widely.

Too often, companies choose representatives for the wrong reasons: because nothing important was going on in the person's area that week or because he

**T**HE BIGGEST MISTAKE technical people make with job fairs is to approach them in the same spirit with which they attend trade fairs — shopping around to see if anything new and interesting is on display.

was attending a meeting in the same city.

Your best strategy is to expect little but prepare to take advantage of the occasional chance that you will meet a communicative and knowledgeable representative. Remember that no matter what the representative you speak with is like, he may pass on your resume to someone who will get excited about it.

The biggest mistake technical people make with job fairs is to approach them in the same spirit with which they attend trade fairs — shopping around to see if anything new and interesting is on display. Hiring manag-

ers often interpret this vagueness as a sign that the applicant does not know what he wants or what he is qualified for and that he is not psychologically ready for a new job.

Keep in mind that the purpose of the firms paying for the job fair is not to sell their organization to potential employees but to find as many qualified prospects as possible. Expect the emphasis not to be on answering your questions about the company but on answering the company's questions about you. Your best

Shape your resume so that it contains as many as possible of the technical qualifications that appear in the ads of the firms most likely to be interested in your past experience. Once at the fair, make every effort to talk at length with firms you have targeted.

While a prime complaint of fair attendees is that they do not get interviews, company representatives report that they try to spend time with potential hires. The greatest obstacle they report is timing: Most candidates show up at rush hour — from 4 p.m. to 6 p.m. — making it difficult to give any individual much attention. Attending at a less popular time may circumvent this problem.

### Fancy meeting you here

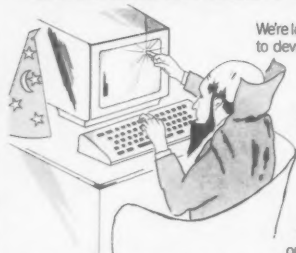
If running into co-workers or your boss at a fair is a possibility and would be a disaster for you at your current job, stay home.

The slight edge you might get from talking face-to-face with a company representative is probably not worth the disruption that an unwanted confrontation could cause.

Instead, mail your resume to the personnel departments of the firms that interest you before the fair takes place, along with a note explaining that you are unable to attend but are interested in being interviewed.

Ruhl is a consultant programmer in Windsor, Conn., and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals*.

## Software WiZards



We're looking for a few technical specialists with the talent to develop and support one of the most complex and successful products in the software industry.

Today, over 11,000 customers benefit from using SyncSort. Our market share is more than 70% and growing every year. Our software wizards continue to develop and support virtually all of the technological breakthroughs in high performance products, as they have for over 18 years.

We need to add a few senior people to our technical teams. Those who join us will have the opportunity to contribute to our tradition of innovation while working in a good team environment. We recognize and reward outstanding contributions to our products and business.

Please contact us immediately if you have strong 370 Assembler skills and experience in one or more of the following areas:

- System Software Development
- Access Methods (including EXCP)
- Software Performance Optimization
- MVS/XA or ESA Systems Services
- Processor Architecture
- Complex Problem Determination

If you'd like to join one of the most talented teams in the software industry, please send us a confidential resume. Attention: Sorcery Department, or call P. Salisbury, Manager, SyncSort OS at 201-930-8260.

**syncsort**  
INC.

An Equal Opportunity Employer

Syncsort Incorporated, 50 Tice Boulevard,  
Woodcliff Lake, NJ 07675

## FLORIDA'S WORLD IS YOURS.

We're Software Services of Florida, providing data processing consulting services to major corporations and small companies. We are currently seeking highly professional consultants meeting the following qualifications:

- DB-2, CSP, COBOL, CICS
- COBOL, CICS
- COBOL, IMS DB/DC (DB-2 & CICS +)
- PL-1, IMS DB/DC
- FOCUS, VM/CMS
- C, ASSEMBLY with OS/2
- MODEL-204
- C, UNIX, INFORMIX
- SPEED 2, on WANG
- ORACLE
- P/A with UNISYS
- HARDWARE, MISER
- SOFTWARE
- DB-2, DBA's and P/A's
- DBA, IMS DB/DC
- COBOL, IDMS, ADS/O
- RAMIS II, IMS
- LOTUS 1-2-3, dBASE III, FREELANCE
- COBOL, LINC II
- ASSEMBLER, COBOL, CICS, OS/JCL
- PICK, BASIC
- BASE COMM, BTRIEVE, LAN, NOVELL

Call toll-free National:

**1-800-237-8181**

Florida only:

**1-800-282-4141**

or send resume to: Cy Dougherty, Personnel Director  
Paragon Crossing, Suite 124, 11300 - 4th St. N.,  
St. Petersburg, FL 33716

Paid Relocation — Excellent Benefits — Salary Commensurate with Experience

**SOFTWARE SERVICES**  
OF FLORIDA INC.

A subsidiary of ORBITER INTERNATIONAL, INC.

## People make us Great!

At Great Lakes Bancorp the people who make us great are our knowledgeable employees and satisfied customers. Challenging opportunities exist in our advanced MIS environment where we are converting from Unisys to IBM 3090 S series with 3745 FEP. This highly technical setting has created a need for the following professionals.

### Project Leaders

This position requires 2-4 years' experience as a Project Leader in an IBM environment. Systematics Software experience is desirable.

### MVS/CICS Systems Programmers

You need 3 years' experience as a systems programmer with MVS/CICS/VSAM/VTAM/TSO and Assembler experience. DASD management is required along with the ability to work independently. Strong leadership skills are also necessary.

### VTAM Systems Programmer

You need 3-5 years' experience with ACF/VTAM, NETVIEW, NCP (V3), NETSPY, NPM and on a 3745 communications processor.

These positions are located at our beautiful, newly expanded Ann Arbor, MI offices. Ann Arbor is home to The University of Michigan and features many educational, cultural, sports and entertainment events. A unique variety of housing options are offered, too.

Stability and commitment to people has helped us grow from 125 employees in 1976 to 1100+ in 1989. Salaries and benefits are competitive. To become one of the people that make us great, send your resume and salary requirements in confidence to: Great Lakes Bancorp, Human Resources Dept., 401 E. Liberty, Ann Arbor, MI 48104.



Equal Opportunity Employer

## MANAGEMENT & PROGRAMMERS

BRIDGESTONE SOFTWARE (U.S.A.), INC., with locations in LOS ANGELES, SAN FRANCISCO and NASHVILLE, is seeking well qualified managers and programmers for each of its IBM Mainframe Shops. Primary language is COBOL in an OS/CICS/DLI environment.

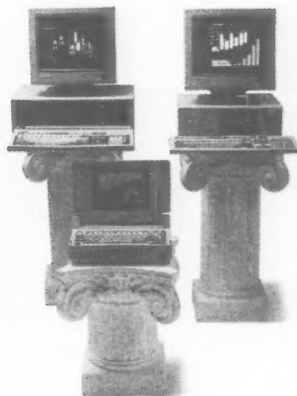
Manager positions require 5 years experience in similar capacity, and proven leadership and technical skills. Programmers with at least 2 years in IBM environment using 3090, 43xx Mainframes. We are also seeking individuals with System 36 AS Programming skills are also in demand. Our users work in distribution, sales, finance and marketing systems.

We offer a competitive salary and excellent benefits package. Send your resume, which MUST include your salary history, along with your LOCATION PREFERENCE (Los Angeles, San Francisco or Nashville) to:

BRIDGESTONE SOFTWARE  
19701 Hamilton Avenue  
Suite 180, Dept. CW  
Torrance, CA 90502

Equal Opportunity Employer M/F/H/V

# Quality In. Quality Out.



At Compaq, the value of our products is simply a reflection of the personal values inherent in each Compaq professional.

Attributes like teamwork, mutual respect, leadership and commitment to quality translate into some of the most advanced business PCs on the market.

Our continued success has created immediate opportunities for professionals at our Houston headquarters.

### Systems Software Engineers

You'll evaluate, design and develop firmware, operating systems, device drivers and utility software for PC systems. Along with your BSEE/BSCS or equivalent degree, you'll need four years' related experience in PC software development, 8086/286/386 Assembly/C language programming in MS-DOS, OS/2 and/or UNIX/XENIX operating system environments.

### Systems Architects

You'll design new products by investigating and evaluating system compatibility and performance of design alternatives and new technologies. You'll develop hardware compatibility tests and performance analysis tools.

Qualify with a BSEE, MSEE preferred, and three years' hardware background with

a knowledge of microprocessor-based systems software. In addition, experience with CPUs/Memory/Bus architecture, numeric co-processors, file subsystems and state machines is required.

### Software Engineers: Test Development

Your design and development talents will be put to the test improving structural software. Increase the reliability of personal computer systems and operating systems software. Qualify with a BSEE or BSCS and four years' experience in software quality assurance or testing. Additional experience in C and 8086/286/386 Assembly language is required.

### Engineering Sales Support

With superior communication and presentation skills, you'll help support our clients and sales staffs in our regional offices. You'll need a BS or BA in Engineering, Computer Science or related field. In addition, you must have a minimum of four years' experience in microsystems application and operations with expertise in micro-to-mainframe communications, multi-user systems software, multi-tasking environments, networking and hardware for graphics.

These positions are available in Chicago, IL; McLean, VA; Philadelphia/Allentown, PA; Phoenix, AZ; Dallas and Houston, TX.

### Database Engineer

Start with experience in multi-user environments, and PC based development techniques. Familiarity with PC networks, distributed applications, and/or C language is desirable. Relational database and SQL experience is a plus.

### Technical Writer

You'll need a minimum of three years' experience documenting hardware and software products in an engineering environment to qualify. In addition, a technical degree or equivalent is preferred.

### Make a quality career decision.

Compaq offers competitive salaries, comprehensive benefits and an unequalled work environment. If you're interested in one of these opportunities, please call us at 1-800-243-9003. Or simply submit your resume along with the position for which you wish to be considered to:

Compaq Computer Corporation,  
Dept. CW4389-YA, P.O. Box 692000,  
Houston, Texas 77269-2000

© 1989 Compaq Computer Corporation.  
© 1989 Accent Software, Inc. All rights reserved.  
Compaq is an affirmative action employer, m/f/h/v.

## COMPAQ

### Programmers PROMOTE YOURSELF TO A NEW CHALLENGE

We seek experienced individuals in specific Computer Specialties National Opportunities (330-5604).

• SYSTEMS 38/386.3  
• C/UNIX DEVELOPMENT  
• MVS & DOS SYSTEMS PROGRAMMERS  
• VAX SYSTEMS SUPPORT

**HAMILTON**  
TECHNICAL RESOURCES, INC.

P.O. Box 368  
West Hurley, N.Y. 12401  
(514) 678-0250  
All fees paid by our client co's

### CRAWFORD & COMPANY A NATIONAL RISK MANAGEMENT SERVICE COMPANY SYSTEMS ANALYST

Crawford & Company, a Risk Management Company has an opening for a strong Systems Analyst with a minimum of 4 years experience in an IBM mainframe environment. This position requires heavy design and implementation experience in Accounts Receivables packages and systems. A proven ability to manage large mainframe projects is required. The candidate must be a team player and have demonstrated the ability to interface with users at all levels. Experience with formal development methodologies and personnel supervision is desired.

Desired technical skills include: IBM 308x, 308x, MVS, TSO/SPF, COBOL, VSAM, CICS. Knowledge or experience with ADABAS/NATURAL systems a plus. Knowledge of PIC Accounting Systems a plus. Degree preferred.

This position represents an addition to staff to support the replacement of all corporate financial systems. The candidate for this position would play a key role in the selection of a new Accounts Receivable package and the subsequent installation of the package.

Crawford & Company offers a competitive compensation package including relocation expenses. Starting date is immediate.

To ensure full consideration, please send a letter of application, and resume to:

Crawford & Company, Employment Office  
P.O. Box 8047, Atlanta, Georgia 30302 EOE M/F

### SOFTWARE DEVELOPERS

As a nationwide placement firm specializing in UNIX system developers, programmers, and software engineers, Innovative Options can help you explore positions throughout the national high tech, R&D community.

Our nationwide clientele and network of affiliates can offer challenging opportunities (without cost to you) in any of the following areas:

- UNIX
- Applications or Systems Development
- Networking/Telecommunications
- Database Development

Prefer BS, MS, or PhD in Computer Science or EE. No entry level positions available. Send your resume in confidence to:

**INNOVATIVE  
OPTIONS**

P.O. Box 87880 • Columbus, OH 43287 • (614) 457-4938

ISOET is a trademark of Bell Labs



# COMPUTER CAREERS

## OSF Operating system of the future.

### The Rewards of Working Together

As a founder of OSF, Digital indicated to the industry its corporate support for open systems. Now, we are investing heavily to ensure that Digital's customers get the highest quality, best cost-performance open systems available.



### Software Engineer Transaction Processing

The recent industry developments in open systems software have created a ground-floor opportunity. Join us now and participate in the establishment of a new software dynasty.

Digital's Seattle Engineering Group is now seeking a consultant-level Transaction Processing Professional with an MSCS/MSEE or equivalent and 8-10 years' experience in developing transaction processing systems. In-depth knowledge of transaction processing technologies is essential including Data Base and Distributed Computation.

For consideration, or more information about this exciting opportunity, please send your resume to: **L. Taylor, Manager, Dept. 0403-9809, Digital Seattle Engineering Group, Digital Equipment Corporation, 14475 NE 24th Bellevue, WA 98007.** Proof of legal right to work in the U.S. is required.

**Digital  
has  
it  
now.**

We are an affirmative action employer.

## SOFTWARE PROFESSIONALS

Computer People Unlimited is Wisconsin's largest locally owned computer-related professional services firm — a direct result of our highly motivated professionals and our dedication to professional excellence. We currently have opportunities available in the Fox Valley, Milwaukee and Madison.

Opportunities exist for individuals with experience in any combination of the following: COBOL, PL/I, ASSEMBLER, FOCUS, NATURAL, IMS/DB, IDMS, ADABAS, DB2, IMS/DC, CICS, ADS/O, RPG III, RPG II, 4680 terminals, S/36, S/38, AS/400, TELON, and MVS/VSE/VM systems programming. In addition, positions are available for individuals with Honeywell, PC or other 4th generation language experience.

We also offer you the opportunity to become involved in developing software for 16-Bit and 32-Bit microprocessors using 'C' and UNIX. We prefer experience in the writing of device drivers and the interfacing of minis and micros, but will consider other complex scientific applications experience.

At CPU you can expect a highly competitive salary and a superb benefits package — not to mention the lakes, scenery and cultural attractions of Wisconsin. Please call Bill Rudd or Scott Fleischman, at (414) 278-8884 or 1-800-527-8462, or send your resume in confidence to Bill or Scott at CPU, Dept. CW-312, 744 N. 4th Street, Milwaukee, WI 53203. No entry level positions available. We are an equal opportunity employer.



## OPPORTUNITIES in the UNITED KINGDOM

Task Force Group offers the following Consultancy opportunities with prestigious clients in the UK.

### I.P.S. UNISYS V-SERIES

The Unisys Item Processing System (IPS) running on V Series hardware is being installed by a major UK Bank in a total rationalisation of its check processing operation. Opportunities exist for individuals with experience of IPS to play a leading role in this major development programme.

### MODEL 204

A major retailing organisation is currently developing several strategic systems using Model 204 DBMS. Personnel of all levels are required to make a significant contribution to ongoing development within the organisation.

Task Force is a member of the largest service group in the world and is the sole provider of computing personnel within the Group. It has past experience of processing and gaining work permits for non UK residents.

Please forward a full resume to the address below and we will contact you with further details.

**DARRYL MORAN, TASK FORCE GROUP  
ALEXANDER HOUSE, BETHESDA STREET  
HANLEY, STOKE ON TRENT  
STAFFORDSHIRE, ST1 3DE, ENGLAND**

**TELEPHONE: +44 782 202022  
FACSIMILE: +44 782 208002  
(Equal Opportunity Employer)**

## Data Processing Professionals

TECHNOLOGY CONSULTING CORPORATION is one of the largest, full service information processing support organizations in the Midwest. We are currently looking for individuals to join us on either a Permanent or Per Project basis. Qualified individuals must have a minimum of 3 years experience with knowledge in the following:

- S/38, AS/400, RPG III, COBOL
- IDMS, ADS/O
- CICS, DB 2

Your expertise will be rewarded with an exceptional compensation package. For more information, contact:

**Human Resources**



TECHNOLOGY CONSULTING CORPORATION

4811 South 76th Street Dept. 210 Milwaukee, WI 53220

Equal Opportunity Employer

**414-282-9700**

The Christian Broadcasting Network, Inc. has openings in their Data Processing Department for a Systems Analyst/Programmer-A and Data Base Administrator.

### SYSTEMS ANALYST/PROGRAMMER-A

Design and implement computer systems to solve business problems. Perform a broad range of analysis, design, programming and support functions. Requires a Bachelor's Degree in Computer Science, Mathematics, Business Administration, Engineering or similar field and three years experience in programming/analysis.

### DATA BASE ADMINISTRATOR

Responsible for the definition, organization, protection and efficiency of the data base in the data resource environment. Requires a Bachelor's Degree in Computer Science, Mathematics, Business Administration, Engineering, or similar field, and four years related work experience.

If you feel led of the Lord to apply, send your resume to:

**The Christian Broadcasting Network, Inc.  
Employment Department  
Box K5  
Virginia Beach, VA 23463**



**IT'S CALLED THE GOLDEN GATE  
FOR GOOD REASON**

Systems professionals can discover career enrichment and personal satisfaction through the rewarding positions available with our prestigious clients. Logical Options and Sanderson Associates have merged forming Northern California's premier Search Firm.

### THE SEARCH FIRM, INC.

595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105  
(415) 777-3900 FAX 777-8632

## PROGRAMMER/ANALYST SYSTEMS PROGRAMMERS TECH WRITERS

Immediate Long-Term Positions. Contract or Permanent with the Best Rates. DON'T DELAY.

- \* FOCUS
- \* UNIX-C
- \* PC/C/ASSEMBLER
- \* DB2
- \* SYS 38/AS-400
- \* ADA
- \* SCRIPT/SQL
- \* M68000/C
- \* MICROSOFT WINDOWS
- \* MS DB/DC
- \* SQL DB2
- \* MS DB/DC
- \* VSE SYS Prog./SECRET
- \* MVS SYS Prog.

### PHONE NOW!!!

4401 W. Tradewinds Ave #303  
Ft. Lauderdale, FL 33308

Headquarters (305) 776-5300  
24 Hour Fax (305) 776-5305



## CONSULTING OPPORTUNITIES

**PER DIEM OR FULL TIME/  
BEST CLIENTS - BEST RATES**

- \* DB2
- \* STRATUS
- \* TELON
- \* CICS
- \* CICS DB2
- \* IDMS
- \* NATURAL 2
- \* SUN Workstations
- \* SUN Administrators
- \* UNIX/C
- \* Realtime Programmers
- \* PLM
- \* 8051/8196 ASSEMBLERS
- \* PL/I or COBOL P/A's
- \* INGRES
- \* ORACLE
- \* INFORMIX
- \* VAX/VMS
- \* Techwriters
- \* NOMAD
- \* FOCUS

### Tekmark Computer Services, Inc.

37 E. 29th St., New York, NY 10016  
(212) 686-9360 (201) 886-2821 FAX (212) 683-4047

### Computer Systems Analyst GS 11/12/13 Computer Systems Programmers GS 12/13 IDMS/R Experts

The United States Secret Service is seeking highly skilled Computer Systems Analysts and Systems Programmers to support a large on-line IDMS/R application system environment. Applicants must have experience with CODASYL Network database systems in an MVS/38 and VTAM environment using TSO/ISPF/POP and COBOL. Computer Systems Analyst applicants must have experience in logical and physical database design and in development of on-line application systems. Knowledge of CASE tools is a plus. Computer Systems Programmer applicants must have knowledge of installation and maintenance of IDMS/R software and IDMS/R internals. ALC programming experience is a plus.

Must be able to pass a full field background investigation for top secret clearance.

Federal career status preferred, but not mandatory.

Send your Application (SF-171) to:

U.S. Secret Service  
Personnel Division  
1800 G Street, N.W.  
Washington, D.C. 20223  
E.O.E.

### ★ Fortune 100 Corp Expands Management Opportunities Minimizes

### Encouraged to Apply

- (1) Systems Manager — to \$55K
- (2) Project Leaders — to \$48K

Client seeks promotable individuals, with 5-10 yrs. experience.

- Manufacturing systems req'd
- Engineering systems desired
- IBM mainframe exp. required
- VAX hardware exp. desired

### ★ Manager Lan Integration to 860K

- Per/Implement LAN network for international corporation.

### ★ (2) Prog./Analysts — to \$38K

- New Applications D.B. project
- DATACOM or D.B. required
- Two yrs min. exp. + ability to move into project leader role.

Positions are in east coast & mid west areas. Search fees, interview and relocation expenses paid.

Stephen J. Burns & Assoc., Inc.

EDP Recruiters Since 1970

Affiliates Coast to Coast

P.O. Box 124

Huntingdon Valley, PA 19008

(215) 671-1243

### CA & AZ CONTRACTS



**CONSULTANTS  
WANTED**



**P. Murphy & Associates, Inc.**

4405 RIVERSIDE DRIVE, SUITE 100

BURBANK, CA 91505

(818) 841-2022 (714) 852-0805

FAX: (818) 841-2122

### ATLANTA SOUTHEAST (404) 447-8773

Contract or Permanent  
Employment Available  
Top Rates and Salaries

### BRANNON & TULLY

is looking for Professionals  
with at least one of the following  
skills:

AS400/S38/S36/DB2/IMS  
IDMS/COBOL/VSAM/DEC  
VAX/VAX/UNIX/CICS  
DBASE/CLIPPER

BRANNON & TULLY, INC.

3189 Holcomb Br. Rd. #875

Norcross, GA 30071

FAX: (404) 728-9803





## COMPUTER CAREERS

### NEW ORLEANS

**Spicy! That's the flavor of New Orleans.**

New Orleans provides its residents an enviable lifestyle. Great restaurants, a warm climate, and world renowned celebrations, such as Mardi Gras and the New Orleans Jazz and Heritage Festival have kept New Orleans the Queen city of the south.

But New Orleans is much more than a great place to live, it's a great place to further your Data Processing career. New Orleans is the home of MSU System Services, Inc., the technical services subsidiary of the Middle South Utilities System. MSU System Services offers excellent data processing opportunities at its New Orleans location. The current hardware environment consists of two IBM 3090/400's in an MVS/XA operating system environment supporting large IMS production applications.

### SYSTEMS ENGINEERS

**Analyst/Programmers**—These positions involve the maintenance and enhancement of medium to highly complex applications utilizing high-level languages to develop multi-system interfaces and to provide production support. Job requirements are one to three years experience programming in COBOL and/or PL-1. Knowledge of OS/JCL, IMS, DB/DC, ADF, Mark IV, and dBase a plus.

**Data Base Analysts**—Working with state-of-the-art technology the selected individuals will be responsible for the design, implementation, tuning, back-up and recovery of IMS data bases. Two plus years experience as a DBA with a thorough knowledge of IMS concepts is required. Knowledge of DBRC and Fast Path is a plus.

MSU System Services, Inc. offers an exceptional relocation package including a relocation allowance (one month's salary) ... paid moving expenses ... paid house hunting trip ... Mortgage Interest Differential, plus Interim Living. For more information, call our toll free number below or send resume to T. Porter, MSU System Services, Inc., P.O. Box 61000, New Orleans, LA 70161.

**1-800-231-4481**

In Louisiana call collect (504) 569-4965



**MSU  
SYSTEM SERVICES, INC.**

An Equal Opportunity Employer M/F/H/V

### PROJECT MANAGERS

### SENIOR ANALYSTS/PROGRAMMERS

We are one of the nation's fastest growing companies. Our senior management is committed to creating the most sophisticated data processing organization in our industry. To accomplish this objective, we are seeking outstanding professionals with strong technical and project management skills.

The individuals selected will be key members of our Application Development Team. They will design systems in a state-of-the-art AS400 environment using structured methodology and CASE tools. The positions will require programming and analysis experience on the System/38 or the 4300 Series.

Our company is located in the Sunbelt and offers year round recreation. We will provide the selected candidates an excellent compensation and benefits package including complete relocation. Send resume to: CW-85154, Computerworld, Box 9171, Framingham, MA 01701-9171.

### CONSULTANTS CONTRACTORS EMPLOYEES

**Human Resources,  
Payroll/Personnel  
CICS/VSAM, DB2**

Please send resume to: Integral Systems, Dept. PS, 2185 North California Blvd., Walnut Creek, CA 94596.

Principals only please. We are an equal opportunity employer.

### MAINE - NH

We have specialized in data processing professional placement in Maine & NH for a quarter of a century. If you qualify for positions in the \$25,000-\$50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.



Att: Dept. 2  
P.O. Box 7040DTS  
Portland, ME 04112  
(207) 773-4748

### SOFTWARE MARKETING

If you have been successful at marketing software to banks or credit unions for at least two years, we would like to hear from you.

Splendid rewards and opportunity, some travel required.

Write or phone  
in confidence to:

Ed Wahl, President  
I.P.S., Inc.  
1957 W. Mountain View Rd.  
Phoenix, AZ 85021  
(602) 944-4854

### SYSTEMS PROGRAMMERS/ INSTRUCTORS

If you possess the ability to communicate your skills to others and a desire to travel, continue your education and be your own boss, then read on. Previous teaching experience a plus. Verhoef Information Packages, a leader in DP Education, is seeking instructors in the following areas:

- VTAM Internals/NCP
- SNA
- APPC

Excellent benefits; 75% travel; 16 weeks paid vacation. Send resumes to:

Nene Sileo  
Verhoef Information Packages  
789 Bloomfield Ave.  
Verona, NJ 07064  
1-800-831-6410

**SOFTWARE ENGINEER:** Develop new operating systems software in RMK kernel and RMK II Operating system group. Design and implement new features of operating system; write external and internal design documents; develop and evaluate new software products. Research background, advanced university training or courses in operating systems, design and implementation of operating system internals; C and PL/I languages and UNIX operating system. BSCS plus 2 yrs. exp. or equiv. (BSCS equiv. to BSCS plus 2 yrs. exp.) \$2,800/mo. Job Site and interviews: Hillsboro, OR. Clip this ad and send with resume to Employment Division, Attn: Job Order Number 2248621, 875 Union Street N.E., Room 201, Salem, Oregon 97311.

Applicant required to have Bachelors Degree in Computers, Math or Engineering plus at least two years of Assembler Programming in ACPT/TF Environment experience. Education and experience will be found acceptable if applicant has a combination of professional development courses, training, and experience equivalent to a Bachelors Degree in Computers plus two years experience with Assembler programming in ACPT/TF environment. Applicant must be willing to relocate to the Dallas/Fort Worth, Texas area after January 1990.

Annual salary will be \$33,000.00 per year for a 40 hour work week. An additional salary may be paid up to \$42,000.00 for additional education and/or experience.

Interested applicants contact the Oklahoma Employment Security Commission, 3105 E. Skelly Drive, Tulsa, Oklahoma 74105-7207. Phone: (918) 749-0861. Refer to job order number 091109. Ad paid by an Equal Employment Opportunity Employer.

**PROGRAMMER/ANALYST** - In consultant environment partake in design, development & implementation of applications software in IBM System 38 environment. Require Bachelor's or equivalent in Data Processing or Computer Science (9 months experience - 1 year academic) with 3 years experience including System 38, RPGII, CL, Structured Design (YOURDON) with insurance applications. Salary: \$36,000 per annum. Job location: San Francisco, CA. Resume to: CW-85152, Computerworld, Box 9171, Framingham, MA 01701-9171.

### CONSULTANTS

**IDEAL/Datacom P/A's  
Medicaid/Medicare -  
System Testers,  
Systems Analysts  
X-WINDOWS Developers  
UNIX Internals**

Project locations in  
Ma., Az., Cal.

These are immediate needs.  
For consideration, please call:

### THE REGISTRY

40 Westinghouse St.  
Wellesley, MA 02181  
(617) 237-9119  
Fax (617) 237-0723

### SOFTWARE SYSTEMS ENGINEER

Design, develop, maintain and enhance in-house computer aided design tools. Design and develop computer aided design/computer aided engineering tools required for computerization and automation of the manufacturing environment. Provide designer support, application engineering support in all design centers. Experience with UNIX System, VAX/VMS, Relational and Hierarchical Database systems and graphic CAD tool software development and C, Fortran, Pascal programming languages. Recal-Redac's Visula computer aided engineering system. Bachelor's or equivalent Computer Science; 2 years experience \$2,850 per month. Send resume with copy of this ad to: Dept. 9053-KC, 4745 N 7th Street, Suite 220, Phoenix, AZ 85014, EOE

**SOFTWARE ENGINEER** engaged in SW & A reliability program aimed at ident. SW eng. req. & est. quantifiable goals for higher quality SW at low dev. costs. Inv. in design & doc. of var. SW dev. project. Des. & maintain database for major SW developmental effort. Inv. use of statistical tools. Req. MS in CS or Oper. Res. + 2 yrs exp. in pos. or as Systems Analyst. Spec. Req. 1) Grad-level coursework in ea. of: Computers, Operating Sys., & Comm Networks relating to SW dev. environments (3 cr. hrs., min.); 2) Grad-level coursework utilizing stat. models, including: SPSS, SAS and STATIS; 3) Per. of ed. &/or exp. must include exp. with relational databases (1 yr.); 4) Must have exp. in SW dev. in Cyber environment (2 yrs). Sal: \$53,500/mo. Res. to: Gary Sompmeyer, (#8-172), MN Department of Jobs and Training, 390 N. Robert St., St. Paul, Minnesota 55101.

### MIS DIRECTOR

Administration of MIS department of Polk County Government. Responsible for budget of \$2.5 million and staff of 40. BS/BA degree in computer science, business administration or related field with 8 years DP experience and 3 years responsible administrative/supervisory experience in a large scale IBM environment. Excellent benefit package. Fully paid retirement. Salary negotiable. Send resume and salary requirements to:

Personnel Department  
Board of County Commissioners  
P.O. Box 330  
Barre, VT 05646  
(613) 534-4569 or 534-4630  
EOE M/F/H

### RECRUIT THE BEST!

Place your ad in regional or national editions of Computerworld's Computer Careers section. For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

One thing  
every  
executive  
should  
have after  
retirement:

An adventure.

Gold watches are fine for some retired executives. But after a lifetime of experience, moving from the trenches to the front offices, your knowledge is worth more—to us and to hundreds throughout the world in need of your special skills.

Through the International Executive Service Corps—the not-for-profit organization that sends U.S. managers to help businesses in developing nations—you can volunteer for short-term assignments in foreign countries where you're truly needed. Although you will not be paid, you and your spouse will receive all expenses, plus the personal satisfaction of teaching others while you discover more about yourself.

It's an adventure of the spirit. And the time to explore it is now. So please, don't let this golden opportunity pass by. Send for more information today.



**International  
Executive  
Service Corps**



Turn your lifetime of experience  
into the experience of a lifetime.

YES, I'd like to share my lifetime of experience with others. I recently retired from my position as a hands-on manager with a U.S. company. I also understand that volunteers and their spouses receive expenses, but no salary. Please send me more information now.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

In what publication did you see this ad?

Write to: IESC, 8 Stamford Forum, P.O. Box 10005  
Stamford, CT 06904-2005. Or, for faster  
response, call this number: (203) 967-6000. BP

### KENDA SYSTEMS, INC.

BOSTON • NEW YORK • WASHINGTON

### SOFTWARE CONSULTANTS

KENDA SYSTEMS provides consultants to the East Coast High Tech Community. Talented professionals with these skills are welcome to register with KENDA SYSTEMS.

- \*ADA SWE/DSGN-CODE-TEST
- \*CSP/CICS AND DB2
- \*PL/I-SPF/CICS OR DB2
- \*SUN/PI/PL OR SCIENTIFIC
- \*STRATUS/ANY LANGUAGE
- \*SIP CONVERSION TO VM/XA
- \*TANDEM/TAL/INTL OR COMM
- \*VAX/C AND SOL/COMM
- \*SIP/RACE OR VTAM/NCP
- \*AS OR SYBASE OR CP/CPS
- \*WINDOWS/C/MULTITASK OR OS2

Forward resume to Roz McKinnon.

50 E 42nd St. Ste. 1508, NY, NY 10017 212/599-6669

## Computer

We believe that the future strength of our company lies in the people we hire today. We seek the best people by offering them an environment in which individual initiative is welcomed...and by offering them the best benefits they will find in the industry.



## GREAT PEOPLE MAKE A GREAT COMPANY

## SQL/DS Senior Database Analyst

As Senior Database Analyst you will be responsible for the start-up and implementation of a SQL/DS environment for scientific applications.

The successful candidate should have one of the following: four years college-level coursework with a major concentration in Computer Science or similar coursework; A.A. degree in Computer Science with two years of experience in database administration, programming, systems analysis or technical support; or four years experience in database administration, programming systems or technical support. IN ADDITION, candidates need five years experience in design and development of database applications (two of which must be in database administration of SQL/DS).

The pride of working for an industry leader is one of our benefits here. But there are others more tangible...our salaries and the finest benefit program in the industry. It includes the best pension plan in the industry, comprehensive health and dental plans, an excellent savings plan...even fitness facilities. If you are interested in working for us, we would like to hear from you. Submit your resume by April 28, 1989 to: Burroughs Wellcome Co., Recruiting and Staffing, Job #60784-1, 3030 Cornwallis Road, Research Triangle Park, NC 27709.

For information on job opportunities with Burroughs Wellcome Co. at Research Triangle Park, call our Job Information Line at (919) 246-8347 from any touch tone phone.



Wellcome

## BURROUGHS WELLCOME CO.

An Equal Opportunity Employer

## CAREER OPPORTUNITIES

S.R.A., a nationwide recruiting firm has numerous exciting and challenging opportunities for Data Processing Professionals with a minimum of 3 years experience in any of the following disciplines:

Sys. Pgrmr.....MVS/XA/SP.....\$5K  
Sys. Pgrmr.....CICS, MVS.....\$4K  
Sr. P/A.....C/UNIX, X.25.....\$6K  
Sr. P/A.....COBOL, CICS.....\$5K  
Sr. P/A.....SYS 38, RPG III.....\$4K  
P/A.....C/UNIX.....\$4K  
P/A.....FOCUS, COBOL, CICS.....\$3K  
P/A.....IDMS/ADS/O.....\$3K  
P/A.....COBOL, CICS.....\$3K  
P/A.....COBOL, CICS, BANKING.....\$3K  
P/A.....COBOL, CICS, MRP.....\$3K  
P/A.....SYS 38, RPG III.....\$3K  
Sr. S/A.....CICS APP. DESIGN.....\$5K  
Sr. S/A.....COBOL, CICS.....\$5K

For immediate consideration on these and other positions send your resume to:

S.R.A., 11414 W. Center Rd.  
Ste. 120, Omaha, NE 68144  
Attn: Kevin McCartney  
(402) 330-5596

## FORTRAN/VAX &amp; PC TURBO PASCAL HEAVYWEIGHT

Chance of a lifetime to build a DP department from scratch and launch a remarkable new PC software system in the market.

Our core business requires you to take over complex statistical analysis and enhance this essential application. Hours flexible, unusual global research company staffed with bright people, spectacular near-northside Chicago offices, report to CEO. If you're FIRST CLASS we NEED YOU. Resume and salary requirements to:

Office of the President  
P.O. Box 11095  
Chicago, IL 60611

## Experienced Programmer/Analysts

CALL US...



## We'll Help You Grow

M.I.S. International headquartered in Michigan with a dynamic division in Atlanta has been providing services to Fortune 500 firms including major automobile manufacturers and suppliers for over 18 years.

We are enjoying exceptional growth, making this a perfect time to step up to a permanent position on our technical staff. We're interested in Programmer/Analysts with at least 2 years of experience in the following:

- IMS DB/DC, COBOL
- DB2, SQL, COBOL
- CICS, COBOL
- IDMS ADS/O, COBOL
- Sys. Prog. IMS CICS
- HP3000, TRANSACT or POWERHOUSE
- HONEYWELL DPSS, COBOL
- UNIVAC 1100, COBOL
- ORACLE

For more information contact: Marie Clark, Director of National Recruiting at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 23360 Commerce Drive, Farmington Hills, MI 48024. Equal Opportunity Employer.



INTERNATIONAL INC.

## SYSTEMS SUPPORT OPPORTUNITIES

At COMPUTER ASSOCIATES INTERNATIONAL, INC., we bring technological innovation to today's industry giants. 85% of the Fortune 500 corporations already use our software, and more are on the way. The following positions are available in our Irving, Texas office:

## Level I Support

Candidates must have 3-5 years' operations experience and 1-2 years' technical support experience. 2-3 years' operating experience is required on one or more of the following products: CA-1, CA-3, CA-7, CA-11, CA-ASM2, CA-DUO, CA-RPT, CA-NETMAN, CA-DYNAM/TLMS. Must be proficient in ALC, COBOL or PL1 programming (1-2 years' experience). Preferred software experience: TSO, ISPF, CMS, SMP, OS/JCL, CICS, SMF, VSAM, OS UTILITIES. Preferred operating systems: MVS, MVS/XA, VM, DOS/VSE, JES2, JES3, DPF. Excellent oral and written communications skills required.

## Level II Support

Must have heavy ASSEMBLER background, with at least 3 years' MVS systems programming experience and 2 years' TSO and CICS experience. PL1 experience is a definite plus. Must be proficient in problem determination and dump analysis and reading. Tape or disk management experience desired; knowledge of IBM Utilities and JCL helpful.

## Conversion Support

At least 3 years' COBOL programming experience is required; ASSEMBLER experience is a definite plus. Must have prior experience with operating system conversions.

## DL1 Development/Support

This combination development and support position for our DL1 Transparency product requires 3-5 years' ASSEMBLER, CICS and IMS experience. DL1 and MVS and/or VSE systems knowledge is desired. Dump reading and debugging skills are essential. Must also possess good communications skills.

COMPUTER ASSOCIATES offers unlimited opportunity for personal and professional success along with an excellent compensation and company-paid benefits package. For immediate consideration, please send resume to: COMPUTER ASSOCIATES INTERNATIONAL, INC., Personnel Department, 909 East Las Colinas Boulevard, Irving, TX 75039. An equal opportunity employer m/v/h.

**COMPUTER ASSOCIATES**  
Software superior by design.

## IBM SYSTEM 38

Major oil and gas company seeks a Senior P/A with a minimum of 5 years experience with RPGIII. Excellent working conditions in a very stable environment. Oil and gas background is strongly preferred and J.D. Edwards would be a plus.

## SR. SYS ANALYST

Very stable nationwide company seeks two individuals with a minimum 8 years of experience in systems analysis. Emphasis in the financial/acc't. industry is required on one position; accounts payable/inventory control on the other. Both positions require 50% travel. Excellent benefits and full relocation.

## MANUFACTURING

International Texas firm seeks P/A ready to promote to DP Manager. One man shop. Manufacturing and/or IBM 38 required. Company will relocate.

## SYS 38

Major Houston corporation seeks assistant P/L. Individual will promote to P/L after 15 months. 4-6 years solid 38, RPG III & a degree required. Company will relocate.

## DDA

National corporation seeks Sr. Deposits Analyst. Client requires in-depth knowledge of DDA & COBOL. Company will relocate.

## ROBERT HALF

DATA PROCESSING  
1300 Post Oak Blvd.  
#1470  
Houston, Texas 77066  
800/358-1994



## Avg Temp 73°

## FLORIDA CONNECTION

DP STAFFING SINCE 1988  
Relational Data Architects: To 45K  
Sr. DBA IMS DB/DC: To 45K  
Proj. Ld RT Assembly C.: To 50K  
Bank Conversions: To 35K  
P/A Intergraph VAX: To 45K  
P/A MVS CICS/DLI: To 35K  
P/A VAX Cobol DCL: To 37K  
P/A Credit Card CICS: To 40K  
P/A MVS IDMS ADS/O: To 35K  
SYS PRO DB2 or CICS: To 50K  
P/A DB2 CSP CICS: To 40K

Call Russell Bray, CPC  
AVAILABILITY, INC.  
Dept. C, P.O. Box 25434  
Tampa, Florida 33622  
813/286-8800  
FAX: 813/986-0574

## Information Engineering Specialists...

## Take A Step

# Forward

With extensive capabilities built on image processing, artificial intelligence, relational data bases, etc., our high technology track record speaks for itself. Utilizing the most sophisticated systems and applications programming tools available, we're maintaining continued state-of-the-art involvement. And, we're not stopping there.

We're taking another step forward with GENESIS...an extensive, multiyear systems development project that will support our servicing capabilities and product innovations for the 1990's.

The Data Management Group is using the latest Information Engineering techniques to build business models which will provide the foundation for the construction of systems. We are now seeking a self-motivated individual with Information Engineering Project Management experience, as well as individuals with Information Engineering consulting background to serve as development session facilitators.

Basic qualifications for the management position include: 5 years experience with Information Engineering Methodology, as well as familiarity with advanced CASE tools and relational data base technology.

Qualifications for specialist positions include 3 years experience with applied use of Information Engineering Methodology.

If you have a strong drive and commitment to reaching new levels of excellence, we invite you to take this step forward with us by sending your resume with salary requirements to: J. Kanyon, AMERICAN EXPRESS, P.O. Box 53897-CW, Phoenix, AZ 85072-3897.

**AMERICAN EXPRESS**  
**TRAVEL RELATED SERVICES**  
An American Express Company  
An Equal Opportunity Employer



# COMPUTER CAREERS MID-WEST

The Cessna Aircraft Company, World Leader in General Aviation has openings for the following positions:

## ANALYSTS ENGINEERING DATA PROCESSING-CAD SPECIALISTS

Requires a college degree in Computer Science or Math. Must have 1-2 years experience with Design Graphic Systems, FORTRAN and a good working knowledge of manufacturing and engineering processes. Also, working knowledge of computing systems, preferably IBM running under MVS.

## DATABASE ADMINISTRATORS

Requires a BSCS or equivalent and 1-3 years experience in IMS database administration including PSB, DBD and ACB gen's reorganizations, recoveries, performance analysis and tuning, logical design and physical implementation.

## ANALYSTS PROGRAMMERS

Requires a college degree, BSCS, Math or related field, 1-2 years experience in developing computer programs for IBM's IMS and 1-2 years experience in developing computer programs for IBM's Relational Database Management System DB2. Time sharing option, COBOL and MVS knowledge required.

If you are qualified for these positions and would like the opportunity to work in an environment of challenge, please send your resume and salary history to, or apply in person at:



Cessna Aircraft Company  
Professional Placement  
K-42 Highway Southwest  
P.O. Box 7704  
Wichita, KS 67277  
An Equal Opportunity Employer



## DOUGLAS & LOMASON COMPANY

Douglas & Lomason Company is a progressive quality OEM supplier to the domestic automotive industry. The first two positions listed below are for our Corporate Office located in Farmington Hills, Michigan and the third position listed is located in Havre de Grace, Maryland.

### SUPERVISOR FINANCIAL SUPPORT

Responsibilities include payroll (MISA) and related systems; general ledger, accounts receivable, accounts payable, fixed assets; as well as associated systems. Qualified candidates should have a bachelors degree; experience with DEC computers and operating environments; five years supporting/installing packaged financial software; and have demonstrated supervision in MIS conversion environment. Additional requirements include: SPERRY Univisys experience; working knowledge of DEC Basic & COBOL; financial package (Collins, Jackson, Ross, etc.) "hands-on."

### COMPUTER OPERATOR

We are seeking an individual with an Associates Degree in Computer Science and who is currently interested in pursuing a four year degree in Computer Science. The successful candidate should prefer a 3rd shift assignment. Responsibilities include Systems back-up, Batch Processing and monitoring communication lines.

### COMPUTER TECHNICIAN

We are seeking an experienced Plant Computer Technician at one of DLI's manufacturing facilities located in Havre de Grace, Maryland. The successful candidate must have a Bachelors Degree or equivalent experience; two years experience in DEC VMS; programming experience in DEC BASIC; and experience in a manufacturing environment. Also preferred is experience in MRP-II, Automated Storage and Retrieval, and FCIX operating systems.

Douglas & Lomason Company offers a competitive benefit package which includes major medical, dental, life insurance, and 401 (K). Qualified candidates should send a resume, references and salary expectations to:

Personnel Department  
DOUGLAS & LOMASON COMPANY  
34800 Hallwood Court  
Farmington Hills, MI 48331  
Equal Opportunity Employer

## Attitude. Intelligence. Careers.

The attitude is one of learning and cooperation. The intelligence is yours! And the careers are fully rewarding... technically, professionally and financially. We'll provide you with a foundation of training, salary and complete benefits, and a history of success in building systems. If you have 2-5 years of experience in ANY of the following:

IBM  
IMS DB/DC  
IMS/ADSO  
DB2

HONEYWELL  
DPS-8  
IDS-II  
DMV/TP

Please call Carol Lee at 1-800-328-9929 or send your resume to her at: Analysts International Corporation, Dept. 199, 7615 Metro Blvd., Minneapolis, MN 55405. EOE M/F/H. No agencies please.

AiC

## ATLANTA & SOUTHEAST

\$25,000 to \$95,000

IMS/ORACLE/DATACOM/IMS/DB2/SYS 38  
VAX MAPICS/FOCUS/CA/DB/CAE  
TECHWRITERS/DP/SALES/IMS

Need Programmers, Programmer-Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.  
3067 Bunker Hill Road, Suite 202  
Marietta, Georgia 30062

FAX: 404-973-4052

PHONE: 404-971-7281

## IDMS ADS/O

NO RESUME  
REQUIRED  
800-874-9595

NPS

NATIONAL PROGRAMMING SERVICES, INC.  
121 EXECUTIVE CENTER DRIVE SUITE 240  
COLUMBIA, SC 29210 TELEPHONE 803-772-9412

Avg. Temp 72°  
FLORIDA CONNECTION  
DP STAFFING SINCE 1968

Relational Data Architects To 45K  
Sr. DBA IMS DB/DC To 45K  
Proj. Ld. RT Assembly C To 35K  
Bank Conversions To 35K  
IA Intergraph VAX To 45K  
P/A MVS CICS/DB2 To 45K  
P/A VAX Cobol DCL To 37K  
P/A Credit Card CICS To 40K  
P/A MVS IMS ADS/O To 35K  
SYS PRO DB2 or CICS To 50K  
P/A DB2 CSP CICS To 40K

Call Russell Bray, CPC  
AVAILABILITY, INC.  
Dept. C, P.O. Box 25434  
Tampa, Florida 33622  
813/286-8800  
FAX: 813/286-0574

PROGRAMMER ANALYSTS  
\$50K-25/hr. Minimum  
Independents Welcome

Mid-west consulting firm has immediate needs: (1+ years duration) VAX System Managers, UNIX-C, TANDEM; (6+ months) VAX - FORTRAN, COBOL, ORACLE, INFORMIX, SQL; IBM - COBOL, IMS, CICS; Sys 38/AS400-RPG III.

Ross & Assoc, Inc.  
PO Box 1724  
St. Louis, MO 63043  
(314) 434-1878

## A Terrific Opportunity

Computer Consulting Group, one of the Southeast's fastest growing contract programming and consulting firms, has immediate openings for talented Programmer/Analysts with 2 or more years experience. Excellent salary & benefits package. We're especially seeking:

SYS PROG DEC OR IBM  
DEC/ADABAS P/A  
VAX/TEL-ACTIVE  
HP 84000/C ENGR  
COBOL/IMS P/A  
IMS/ADSO/MAINF  
VAX/FORTRAN  
VAX/COBOL  
NATURAL/ADABAS  
WANG/COBOL P/A  
Q-CLEARANCE  
DEC/POP FORTRAN  
HP/TRANSACTION  
TECH WRITERS  
DEC/NETWORKING  
VAX/DB P/A

Computer Consulting Group  
Contract Professional Services

Research Triangle Area  
4109 Wake Forest Rd.  
Suite 307  
Raleigh, NC 27609  
1-800-222-1273

Computer Systems Design/Consultant wanted to perform assignments for clients throughout United States in the banking financial industry. Duties include: Analysis of existing computer software needs; design, develop, program; test; and debug sophisticated FSA based computer software using Fourth Generation language for application on UNISYS computer equipment and train end-users; requires Bachelor degree in Computer Science and 2 1/2 years computer science experience; at least 1 year experience in design of software for financial industry using various sophisticated computer languages; or 1 year experience in computer system development for UNISYS 8-20 computer equipment; \$36,000/year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202, Ref. #4799. Employer paid ad

## COMPUTER PROFESSIONALS

We are an executive search firm with over 175 affiliated offices nationwide with resources to find the right opportunity for you.

\* GOLD \* C ASSEMBLER  
\* System 38 \* Aerospace  
\* MOOCOMP \* DEC-VAX  
\* PACBASE \* TELON  
\* MVS COBOL \* IMS DB/DC  
\* IDMS \* TANDEM

Mail resume or call:  
PROBE INC. of FLORIDA  
7001 N. Atlantic Ave., Ste. 102  
Cape Canaveral, FL 32920  
(407) 784-4848  
All Fees Assumed by Client Companies

TRY OUR  
24 HOUR  
ON LINE DP  
JOB LISTINGS  
CALL  
919-222-0979

DP RESOURCES, INC.  
P.O. Box 5057  
Burlington, NC 27214-5057

## CONTRACT PROGRAMMERS

2+ Years Experience in Any of the Following:

• IBM COBOL/CICS  
• IBM ASSEMBLER  
• DLI  
• IMS DB/DC  
• SYSTEM 38

INTEGRATED COMPUTER SERVICES  
P.O. Box 341334  
Memphis, TN 38184  
(901) 365-1211

## RECRUIT ONLY THE BEST!

Place your ad in regional or national editions of Computerworld's Computer Careers section. For more information, call Lisa McGinn at 800-343-8474 (in MA, 508-479-0709).

# Now you can recruit the right people in the right places at the right price

It's the IDG Communications Computer Careers Network, and it lets you run the most targeted and cost-efficient recruitment program possible.

Its many options help you recruit qualified computer and communications professionals - regionally or nationally - with combination buys of up to five leading newspapers. And all together, the Computer Careers Network delivers your message to an audience of well over 1 million qualified computer professionals.

## Look at what the Computer Careers Network lets you do:

Customize your recruitment program. The Network's five newspapers - Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week - let you tailor your recruitment program to your specific needs. You can buy as many as five newspapers with add-on options. That way you can recruit from the combination of computer and communications professionals that's best for you.

Target your ad placement. You can place your advertising exactly where you want. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Or you can extend your reach by running in two regions - or even nationally. Plus - you can still take advantage of stand-alone national rates for individual newspapers.

Reach qualified professionals cost efficiently. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network lets you buy the combination of newspapers that will deliver your recruitment message to qualified computer and communications professionals - and only those qualified professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you, or contact John Corrigan, Classified Advertising Director, at 508-879-0700 ext 676.

One quick phone call can give you all the information you need to run your recruitment advertising in up to five leading industry newspapers.

## SENIOR SYSTEMS ANALYST

Dramatic growth in products and markets has created demand for a talented individual to design portable application development tools in a SOL-based relational database management system environment using artificial intelligence techniques. Position requires MS in Computer Science and/or Electrical Engineering or completion of relevant course work. Minimum of one year experience in the following areas required:

Operating Systems: UNIX, AIX, VMS, MS-DOS  
Language: C, SQL, Assembly  
Programming Interface: LEZ, VACC, XWindows  
Hardware Platforms: HP9000 Series, DEC VAX  
IBM RT, IBM PC

We're a Milwaukee based company serving a national client base with leading edge data processing products and services. If you meet the above qualifications, we want you to join our team of talented and motivated professionals. Salary from \$28,000 to \$32,000. Send your resume and salary history in confidence to:

Otto Peterson

Milwaukeeke Downtown Job Service  
819 North 6th Street  
Milwaukee, WI 53203



## COMPUTER PROFESSIONALS

Now is the time for...

- ☐ CASE technology
- ☐ COBOL Application Generators like Netron/CAP
- ☐ Automated Design Tools like Excelsior
- ☐ COBOL Reengineering tools like Structured Retrofit and Pathvu
- ☐ Project Estimating Tools like Estimacs
- ☐ Group Design Techniques
- ☐ Relational DBM S technology like INGRES
- ☐ SQL

Now is the time to work in a multi-vendor environments with IBM, Novell LAN, DEC and more. Now is the time to develop systems for the 1990's using PC's and other exciting state-of-the-art technology.

**Now is the time for Aetna!**

Aetna's Development Center in our Windsor, Connecticut facility has an immediate opening for an entrepreneurial individual with expertise in Testing, Maintenance, Application Generators and Structured Analysis and Design to increase productivity in systems development and maintenance.

If you have experience in one or more of the above areas, have a background in COBOL application development using structured analysis and design techniques and would like an opportunity to work with all of these tools, we want to talk to you.

Aetna offers an excellent salary and benefits package, professional environment and opportunities for advancement.

Send your resume to Daniel Bautista, Corporate Staffing, Dept. 1207F, Aetna Life & Casualty, 151 Farmington Avenue, Hartford, CT 06156. Or call (203) 683-3251 for more information.



An equal opportunity affirmative action employer

W

hen you join Mervyn's, you join a major division of Dayton Hudson Corporation, with over 200 stores in 15 states and sales in excess of \$3 billion.

### Director, Systems & Programming

We seek the expertise of a 21st century oriented M.I.S. executive who has the leadership, managerial ability, and technical expertise to take us into the next generation of information systems.

The ideal candidate possesses a successful track record of directing a large M.I.S. (IBM mainframe MVS/XA) facility and has been instrumental in the implementation of innovative projects.

Your expertise in the areas of CASE technology, Expert Systems and Decision Support methodologies will provide you with a high degree of visibility within our corporation and our industry.

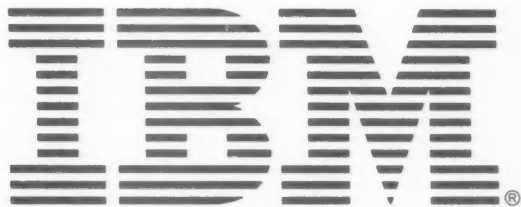
Working out of our San Francisco area facility, you will manage a talented group of six managers and 100 professionals with the latest state-of-the-art computing tools.

Because you're currently successful and well respected, you may not be considering a career move. That's why we should talk.

For immediate consideration, please contact: Mervyn's, Ad# MCS-551, 22301 Foothill Blvd., Hayward, CA 94545; or FAX your resume to (415) 727-3479. EOE

# MERVYN'S

## Business Application Programmers



## Application Development Opportunities

From managing inventory to tracking receivables, application software is helping today's leading-edge companies control their business. And IBM is looking for leading-edge application programmers to help develop high quality software that meets the needs of those companies.

At IBM's Application Systems Division Laboratory in Atlanta, Georgia, we develop integrated application software for business professionals, for specific industries, and for cross-industry use. We currently have challenging opportunities available on our Construction, Distribution, and Manufacturing industry development teams. We are looking for programming professionals with experience in one or more of the following:

- IBM DMAS, CMAS or MAPICS installation and modification
- IBM AS/400, S/38 or S/36 application programming
- RPG/400, RPG III or RPG II application programming
- IBM AS/400 or S/38 data base programming

If you have at least 4 years of this type of experience and a Bachelor's degree in Computer Science, or the equivalent experience in a computer science field, you may be the professional we are looking for. At IBM, you'll be involved in application development assignments that will provide you with outstanding professional growth and stability.

To find out more about these opportunities and our excellent compensation and benefits, send your resume in confidence to: IBM Corporation/Application Development Opportunities, Dept. CW-489, Suite 500, 1201 West Peachtree Street NE, Atlanta, GA 30367-1200.

An equal opportunity employer

## COMPUTER PROFESSIONALS

WHAT IS IT WORTH IF YOU'RE THE BEST IN THE FIELD OR ARE LOOKING FOR THE BEST?

IT'S WORTH A ..... **Fortune**

We understand the needs of the computer industry and the levels of skill necessary to satisfy your requirements. Top professionals deserve to work with the best when it involves your career or your company's needs.

Our personnel specialists are a part of a National Network that combs the country in search of the best qualified professionals. If you or your organization are at a crossroad, call us TOLL FREE for an independently owned and operated office serving your area.

1-800-221-4864



## COMPUTER CAREERS

Data Processing

**Looking for people who seek professionalism.**



CARA Corporation's expanding client base has created the need for qualified, professional consultants. Join our staff of highly respected and dedicated professionals who, since 1975, have set the standard in consulting by achieving goals for leading edge Fortune 500 companies. Opportunities are currently available in Chicago, Phoenix, and Seattle.

### PROGRAMMER/ANALYSTS

We require a minimum of 2 years on-line development, design and applications experience in any of the following: CICS Macro, IMS DB/DC with BAL or PL/I, IDMS ADS/O, or DB2. Ability to interact with a varied client list and excellent communications skills required.

### SOFTWARE ENGINEERS

A minimum of 3 years experience in the design and development of real time software, knowledge of real time operating software and "C", FORTRAN, PASCAL or Micro-Assembler Languages required. A degree in Physics, Electrical Engineering, or Computer Science is essential. We design and develop a variety of applications including process control and embedded software.

In return, CARA offers qualified candidates outstanding salaries, medical, dental, life and disability insurance, tuition reimbursement, and 401k deferred income plan.

Call CARA during business hours Monday through Friday, or send your resume in confidence to: CARA Corporation, Personnel Department, 1901 South Meyers Road, Oakbrook Terrace, IL 60181. (312) 953-0600.



CARA CORPORATION

An Equal Opportunity Employer

Software solutions for better business.

A Spiegel COMPANY

## Senior Systems Analyst/Programmer

Position is available in the R&D laboratories of The BFGoodrich Company in Brecksville, Ohio. Qualifications include a bachelor's or master's degree in Computer Science or related discipline, plus significant experience in VAX/VMS technical computing environment and strong background in PC support. Relational data base experience is required and Ingres Data Base experience is a plus.

The responsibilities include development and implementation of research/technical data bases, integration of PC's and VAX computer environments, design and implementation of technical computing applications, and internal consulting on use of computer systems in R&D environment.

If you welcome challenge in a rewarding atmosphere we invite you to submit your credentials in confidence to: **THE BFGOODRICH R&D CENTER, Attn: Sr. Staffing Representative, Brecksville, Ohio 44141.** Please include salary history and expectations and references. An Equal Opportunity Employer M/F.

**BFGoodrich**

# It's the efficient way to recruit qualified computer professionals



Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

**You choose the newspapers.** Depending on who you're looking for, you can select the combination of five newspapers that best suits your needs - **Computerworld**, **InfoWorld**, **Network World**, **Digital News**, and **Federal Computer Week** Editions.

**You choose the region.** If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

**You don't pay for readers you don't want.** Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Classified Advertising Director, at 508-879-0700.

### Sales Offices

John Corrigan, Classified Advertising Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 508-879-0700.

**BOSTON:** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, Regional Manager; 800-343-6474. (In Massachusetts, 508-879-0700) Andrew Rowe, Account Executive.

**NEW YORK:** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

**WASHINGTON, D.C.:** 8304 Professional Hill Drive, Fairfax, VA 22031; Katie Kress, Regional Manager, 703-573-4115; Pauline Smith, Account Executive 800-343-6474.

**CHICAGO:** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Executive 800-343-6474.

**LOS ANGELES:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

**SAN FRANCISCO:** 18008 Sky Park Circle, Suite 145, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

# MARKETPLACE

## PC investments: Rent or buy?

*Threat of technology obsolescence helps drive a rental boom*

BY RICHARD PASTORE  
CW STAFF

Why invest in PC purchases when the machines are likely to be obsolete in a couple of years?

That question is one that managers at small shops and Fortune 500 companies alike are asking. For many, the answer leads them to rent or lease short-term rather than buy personal computers.

The threat of technology obsolescence weighs heavily in this decision. "We find we can get rid of [outdated machines] easier that way," says Wayne Allen, data processing director at Entex, Inc., a Houston-based natural gas utility that leases approximately 200 microcomputers.

Cautious companies can audition new technology by renting first. "People may be renting machines both for evaluation purposes and to work with them until some of these technologies become more solidified," says Bruce Stephen, a PC analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

There are several other situations in which renting a PC can be more appropriate than buying.

"If you're going into a city for

a trade show, or if you're going to be at a client site for three or four weeks, it makes sense to rent," Stephen says. "Or if you're considering laptop computers and don't really know if they will be useful for you, you might want to give them a trial run by renting one for a month."

### Weighing the costs

When the case for renting is less clear-cut, firms can defer to their accounting departments for financial counsel.

In deciding whether to lease or buy a computer, users should weigh considerations such as tax deductions for depreciation and interest, according to Ken Bouldin, president of the Computer Dealers and Lessors Association.

"Most companies have the capabilities within their accounting department to do that. It's the same argument as whether to lease or buy a Mercedes," Bouldin says. "Every business has got to do its own analysis of lease vs. buy to find out which is the most appropriate for them."

Renting is not always the best solution. Bouldin says a company with long-term needs can save money by buying if it can predict how long it will use the hardware, or if it has the capability to

resell the equipment when ready to make a change.

If a business does opt to rent, it faces the choice of dealing with a direct or indirect rental source. In the direct approach, a company contacts a rental firm and orders a number of machines. The

This indirect approach, though seemingly more complicated, lets the renter deal with his local vendor for the equipment purchase and support; the vendor will continue to support the PCs even after his client has sold them to the rental agent. Meanwhile, the rental agent remains in the background, according to Joe Kelly, president of Greenwich, Conn.-based Randolph Computer Corp., an indirect rental agent.

annually, the number of rental firms is also multiplying — by as much as 50% in some areas.

"The demand is growing. However, the competition is growing even faster," says Jerzy Novosielski, general manager at Corporate Systems, Inc., a rental company in Cambridge, Mass. He acknowledges that this competitive crowding is pressuring prices downward — in his case, by about 20% in the last 12 months.

IDC's Stephen agrees. "The number — both independents and chains — getting into the business is certainly increasing," he says. With the market estimated to be as large as \$250 million a year, even more rental firms will want to get in on the act — driving fees still lower, he adds. Clearly, it is becoming a renters' market.

Pastore is a *Computerworld* copy editor.

**E**VERY BUSINESS has got to do its own analysis of lease vs. buy to find out which is the most appropriate for them."

KEN BOULDIN

COMPUTER DEALERS AND LESSORS ASSOCIATION

rental firm configures the units to the renter's specifications, delivers them to the intended location and installs them. The rental agent is then responsible for maintenance for the life of the contract.

With the indirect method, a customer actually buys the micro from the manufacturer or a value-added reseller. Then a rental agent steps in, buys the machines from the customer and rents them back to him. The rental agent shoulders the risk of the hardware's depreciation along with the burden of disposing of the units when they are no longer useful.

Rental contract terms vary considerably. Random checks on monthly fees for IBM Personal Computer XT-type machines uncovered a range of \$75 to \$140. Fees for Apple Computer, Inc. Macintoshes varied from \$200 to \$799 per month. These prices include maintenance, but delivery and installation are usually extra — \$20 on average for two or three units delivered within a 20-mile radius. Most rental firms offer volume discounts.

Obviously, it is wise to shop around. Savvy customers can exploit the fact that while rental demand is expanding about 18%

### Index

<b>Marketplace</b> .....	91
Used/Lease/Rent .....	91
Hardware .....	96
Software .....	96
Peripherals/Supplies .....	96
Graphics/Desktop Top Pub .....	96
Time/Services .....	95
Bids/Proposals/Real Estate .....	96
Business Opportunities .....	96
<b>Training</b> .....	97

### The BoCoEx index on used computers

Closing prices report for the week ending March 24, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	\$650	\$750	\$550
XT Model 086	\$1,050	\$1,150	\$900
XT Model 089	\$1,175	\$1,575	\$1,000
AT Model 099	\$1,900	\$2,000	\$1,525
AT Model 239	\$1,775	\$2,100	\$1,775
AT Model 339	\$2,100	\$2,375	\$1,800
PS/2 Model 30	\$1,375	\$1,550	\$1,000
PS/2 Model 50	\$2,150	\$2,400	\$1,900
Compaq Portable I	\$650	\$750	\$550
Portable II	\$1,900	\$2,100	\$1,750
Portable III	\$2,800	\$2,950	\$2,500
Portable 286	\$1,700	\$1,975	\$1,675
Plus	\$1,050	\$1,250	\$900
Deskpro 286	\$2,100	\$2,350	\$1,800
Deskpro 386	\$3,750	\$3,975	\$3,675
Apple Macintosh 512	\$625	\$775	\$550
512E	\$775	\$975	\$600
Plus	\$1,050	\$1,225	\$1,000
II	\$3,925	\$4,450	\$3,425
Toshiba T3100	\$2,000	\$2,325	\$2,000
Zenith 183	\$1,400	\$1,500	\$1,000

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

### Used/Lease/Rent

#### ATTENTION

IBM AT & AT Clone Users  
**SAVE-SAVE-SAVE**

4 Megabyte extended memory board  
(120 NS speed) Micron Tech P.N.  
MBAT 410-D .....\$900.  
(Dealer cost on this board is \$1397.)

Full 1 year warranty

#### ALSO

Orchid EC701, ECCELL multifunction  
card for AT-OK, error correction ..\$190.  
EC704, ECCELL-RAM Daughter-Card  
OK RAM, 2mb capacity .....\$90.

TEL: (508)798-3490 FAX: (508)798-3478

**Industrial  
Electrosurplus**  
For Sales, Service, & Repair  
225 Main St., Dept. 200, Andover, MA 01810

#### BUY • SELL • RENT • LEASE

#### MEMOREX • TELEX

TERMINALS • PRINTERS  
CONTROLLERS

MODELS: 078, 079, 178, 179,  
276, 277, 278, 287D2, 387

CALL: PETE DOCKTER  
**LEASING ASSOC. CORP.**  
ONE CIRCLE WEST  
STAMFORD, CT 06902

(203) 978-1400

## WANT TO BUY

3720'S • 3725'S

## FOR SALE

3720's • 3725's • 3745's

DDC Communication Controller Specialists

Distinctive Dataprocessing Consultants, Inc.

Call us for a quote on your  
features, upgrades, and line sets!

(214) 869-2214

FAX 214-869-1589

#### BUY & SELL

#### DATA GENERAL

Desktop to MV's

Systems - Upgrades - Options

**WANTED - USED MV's**

**AMES SCIENCES, INC.**

(301) 476-3200

FAX: (301) 476-3396



# CLASSIFIED

## Used/Lease/Rent

**IBM**  
**SERIES 1**  
**SYSTEM 36/38**  
**SYSTEM AS/400**  
**4300**  
• Lease  
• Trade  
MEMBER OF CMA  
\* SPECIAL LEASE RATES ON NEW AS/400's  
• Buy • Sell • New • Used  
**NEWPORT LEASING, INC.**  
**800-6789-IBM**  
2 Faraday, Irvine, CA 92718  
714/770-2122 FAX: 714/770-5441  
IBM A FRUITLAND/IRVINE, CA  
INTERNATIONAL BUSINESS MACHINES INC.

**NEW ADM™ TERMINALS**  
**FACTORY DIRECT FOR LESS!**  
ZENTEC Corporation, manufacturer of the ADM terminals (previously manufactured by Lear Siegler), now offers these Models factory direct to you for less!  
**ADM3E ADM11 ADM11plus**  
**ADM12 ADM12plus ADM1178 ADM220**  
CALL 800-332-5631 Outside CA or 408-727-7662 X596  
FOR PRICING & IMMEDIATE DELIVERY!  
FOR PROMPT SERVICE/SUPPORT CALL DOW JONES  
SERVICE COMPANY AT 800-532-7373

**ZENTEC**

**IBM SPECIALISTS**  
SELL • LEASE • BUY  
S/34 S/36 S/38 AS/400  
3741 3742  
• New and Used • IBM Maintenance Guaranteed  
• All Peripherals • Immediate Delivery  
• Upgrades and Features • Completely Refurbished  
**800-251-2670**  
IN TENNESSEE (615) 847-4031  
**COMPUTER MARKETING**  
of America, Inc.  
PO BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

**IBM**  
BUY • SELL • LEASE  
CMA  
**AS/400**  
**S/3X**  
**S/1 POS**  
**PARTS**  
**AMCOM**  
CORPORATION  
**800-328-7723**  
612-829-7445  
5555 WEST 78TH STREET  
MINNEAPOLIS, MN 55435

**DEC**  
BUY • SELL • TRADE  
"We love to spend money  
buying DEC equipment!"  
**CCI**  
**Carlson Computer**  
**International**  
3534 E. Sunshine  
Springfield, MO 65804  
(417) 887-1907 (800) 548-7073  
FAX 417-887-2305  
**MEMORY CHIPS**  
BUY • SELL  
We sell the entire DEC line  
specializing in memory.  
**dca**

**FOR SALE**  
**Available**  
**June 1989**  
**IBM 4361**  
**PROCESSOR**  
**ML-5 (12MB)**  
**DASD Units:**  
1-3340 1-3344  
1-3370-A1 1-3370-B1  
1-3370-A2 3-3370-B2  
1-3278 Console  
1-2821 Control Unit  
1-2540 Card Reader  
**IBM Maintained**  
F.O.B. Harrisburg, PA  
J.J. Kerestes  
717-939-9551  
**Pennsylvania Turnpike**  
**Commission**  
P.O. Box 8531  
Harrisburg, PA 17105

**HP 3000**  
**ATP's • S/70**  
**7937H • 7933H**  
Available in Quantity  
**Processors • Peripherals**  
**Systems**  
All In Stock - Immediate Delivery  
All warranted to qualify for  
manufacturer's maintenance  
**BUY • SELL • TRADE**  
**RENT • LEASE**  
**ConAm Corporation**  
It's Performance That Counts!  
800/643-4954 213/829-2277

**Reconditioned**  
**digital™**  
**Equipment**  
Whatever your requirements are for  
Digital Equipment, call CSI first! Buying,  
selling, trading, leasing, consignments -  
we do it all!  
CSI sells all equipment with a 30  
day unconditional guarantee on parts  
and labor and is eligible for DEC  
maintenance.  
Offering systems, disk drives, tape  
drives, printers, terminals, memory, op-  
tions, boards, upgrades and many  
more.  
**CSI** Compux Systems, Inc.  
75 Torca Dr. Stoughton, MA 02072  
CALL TOLL-FREE 1-800-426-5499  
In Mass. (617) 344-8800  
FAX (617) 344-4199

**AS-400**  
**TOTAL**  
**SUPPORT**  
**SELL-LEASE**  
**OPTIONS**  
800-426-5377  
612-941-1099  
10340 Viking Drive  
Eden Prairie, MN 55344

**DEC PDP-11**  
SYSTEMS & PERIPHERALS  
**THE**  
**One-Stop**  
**EXCHANGE!**  
• CPUs • TERMINALS  
• DISC DRIVES • PRINTERS  
• INTERFACES, ETC.  
**dca** DIGITAL  
COMPUTER  
EXCHANGE INC.  
27773 Industrial Blvd., Hayward, CA 94545  
FAX (415) 887-6886 TEL 708038  
Call (415) 887-3100

**DEC VAX & AT&T**  
**BUY-SELL-NEW-USED**  
Systems, Peripherals, Options  
available for sale  
Looking to purchase VAX  
and AT&T Systems, Hardware  
**LAKEWOOD COMPUTER**  
**CORP.**  
836 Link Lane  
FL Collins, CO 80524  
(303) 493-6406 FAX: (303) 493-6409  
**dca**

**MEMORY DRAMS AND MODULES SALE**  
**MEMORY DRAMS:**  
256K-80 nsec. \$7.00  
256K-80 nsec. \$7.00  
256K-100 nsec. \$7.00  
256K-120 nsec. \$7.00  
256K-150 nsec. \$7.00  
1 Meg-80 nsec. \$7.00  
1 Meg-100 nsec. \$7.00  
256K-10, 40 \$14  
64x4-10, 12 \$8.00  
VIDEO RAMS \$14  
Eprom: 27128-200 nsec. \$7.00  
27256-200 nsec. \$7.00  
27512-200 nsec. \$7.00  
**MEMORY MODULES:**  
1 Meg x 9 SIMM \$195  
1 Meg x 9 SIP \$195  
256 x 9 SIMM \$195  
256 x 9 SIP \$195  
STATIC RAMS: 8K x 8-100LP \$7  
32K x 8-100LP \$7  
32K x 8-100LP \$7  
Static Chip Module: 256 x 9-80nsec. \$68  
80286/10/12Mhz \$7  
V20-10Mhz \$7  
80386 16/20Mhz \$7  
**Please call for**  
**PLCC, ZIP, SOJ AND ALL IC'S.**  
We also sell hard drives at the lowest price  
\*Quantity discount available  
\*Prices are subject to change without notice  
**818-709-4172**

**IBM Unit Record**  
**Equipment**  
**Data Modules/Disk Packs**  
**Magnetic Tape/Diskettes**  
029-082-083-084-085-088  
129-514-519-548-557-188  
2316-3336(1)&(11)-3348(70)  
80-200-300 MB  
**Disk Packs**  
**Thomas Computer Corp.**  
6838 W. Howard Chicago IL 60648  
800-621-3906 312-647-0880

**BUY**  
**DEC • DG**  
**VAX, MICROVAX & MV SERIES**  
• Systems  
• Peripherals  
• Modules  
— Hard To Find Items Our Specialty —  
**MAXTOR 2190 - NEW \$1550.**  
Call George H. Travnitski  
**Int'l Computer Exchange, Ltd.**  
(617) 585-8688  
FAX: (617) 585-9177  
**NEW**  
**USED**

**Computerworld's**  
**Classified Marketplace**  
**gives you reach to over**  
**612,000 potential buyers!**  
And this audience is even verified by the Audit Bureau of Circulations in the only independently audited pass-along survey of its kind. What's more Computerworld's Classified Marketplace penetrates buying companies in all major industries. That's because Computerworld's total audience blankets key vertical markets that are major users - and major buyers - of computer products and services.  
So if you're selling computer products and services, advertise in the newspaper that delivers over 612,000 potential buyers. Advertise in Computerworld's Classified Marketplace!  
**For more information, call**  
**800/343-6474**  
(In MA, 508/879-0700)  
**COMPUTERWORLD**  
**CLASSIFIED MARKETPLACE**  
*Where all computer buyers and sellers can go to market.*



**Used/Lease/Rent**

Partial Listing

Systems	DATA GENERAL	Peripherals
MV 20000 MOD1	Memories/Options	6161 S/S 147MB
MV 20000 MOD2	MV20000 4.8,16,32 MB	6160 S/S 73MB
MV 15000 MOD20	MV15000 2.4,8 MB	6214 S/S 602MB
MV 10000 8MB	MV8000 2MB	6061 S/S 192MB
MV 8000-II 8MB	S-140 250KB	6122 S/S 277MB
MV 8000 9300 Series	DESKTOP (All Sizes)	6329 120MB
MV 7800 4MB	ISC - 2	6236 S/S 354MB
MV 4000 DC Loaded	IAC - 16	6237 S/S 1.06GB
MV 4000 2MB	IAC - 8	6239 S/S 592MB
S-140 HFP, BMC	Terminals	6125 Streamer
Desktop All Mods	D200	6026 S/S 800/1600 BPI
System Upgrades	D211	6300 1600/6250 BPI
MV20000 Mod 1 to Mod 2	D215	4374 1200 LPM
MV15000 Mod 8 to Mod 20	D410	4373 890 LPM
MV15000 Mod 10 to Mod 20	D460	4327 300 LPM

**International Computing Systems**  
Box 343 Hopkins, MN 55343  
(612) 935-8112 FAX (612) 933-9664

WANTED: DEAD OR ALIVE - All DG Systems

**BUY \* SELL \* RENT \* LEASE**

3178	3174	3262
3179	3274	3268
3180	3276	3287
3191	3278	4224
3192	3279	4234

Large inventory.  
Quick delivery.  
Most models and  
features in stock. All  
machines refurbished.



URS Information Systems, Inc.  
One Pope Street  
Wakefield, Ma. 01880  
617-438-4300  
CIMA Member

**HEWLETT - PACKARD**

**1000 • 3000  
9000**

Computers • Peripherals  
Terminals  
Buy • Sell • Rent • Lease

**EURODATA INC.**

2574 Sheffield Road  
Ottawa, Canada K1B 3V7  
**613-745-0921**  
FAX: 613-745-1172

**We Buy & Sell  
DEC  
Systems  
Components**

call: **713  
445-0082**  
600 Kerkov, Ste C22  
Houston, TX 77060

**DATA GENERAL  
BUY-SELL-TRADE**

SYSTEMS, PERIPHERALS, OPTIONS,  
TERMINALS AND PARTS

**DATA INVESTORS  
CORP.**

6 WEST 18 STREET  
NEW YORK, NY 10011

**212-675-1000  
FAX 212-645-4539**

**VAX RENTALS**

**MV 3500/3600  
MICROVAX II  
VAX 6000 SERIES  
VAX 8000 SERIES  
Systems & Peripherals**

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility

9 Months • 12 Months • 36 Months

**BROOKVALE ASSOCIATES**  
dtd Digital Dealers Association

EAST COAST WEST COAST  
(516) 273-7777 (206) 392-9878

**SALE OR  
LEASE  
DATA GENERAL**

- MV20000
- 5.5MIPS
- ZERO TO 64 MB
- MV15000 UPGRADES
- MOD 10 TO 20
- MOD 8 TO 20
- MOD 8 TO 10

**213-215-0641**  
**CATALINA  
COMPUTERS, INC.**

1001 W. Arbor Vitae St.  
Inglewood, CA 90301  
FAX 213 649-1065

**SAVE  
UP TO 50% ON  
"WANG"**  
Get a bang  
For your buck.  
Buy "WANG" from us!

**NORCOMEX LTD.**  
Second User Equipment  
34 Putnam Gate, Unit 17  
Concord, Ont. Canada L4K1B8

OVERSEAS INQUIRIES CALL COLLECT  
(416) 738-0803 (416) 738-1059  
TELEX 06-986391 TOR.FAX (416) 735-9013

**IBM Displaywriters**

5525 — OFFICE SYSTEMS  
5219 — 5253 — 5258

6670 PRINTERS  
SYSTEM/34/36

WANG — NBI — PC'S

**CDB FINANCIAL, INC.**

3520 DILLON ROAD  
DALLAS, TEXAS 75228  
800-548-6791  
214-324-3491

Member: CDIA

**IBM**

**BUY • SELL • LEASE**

Member  
Computer Dealers  
& Lessors Association



**SERIES  
1**

**SYSTEM  
36/38**

**AS/400**

**43XX  
30XX**

**AT&T  
VOICE  
SYSTEMS**

- Processors
- Peripherals
- Upgrades

**DEMPEL**

**ASSOCIATES**

18377 Beach Blvd., Suite 323  
Huntington Beach, CA 92648 (714) 847-8486

**(800) 888-2000**

**HONEYWELL**

LEVEL 6 DPS 6 SERIES 16

- Complete Minicomputer Line  
New & Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance  
Guaranteed
- Immediate Delivery  
Low Prices
- HDS 5 and HDS 7  
Compatible Terminals

The Recognized Leader  
in Honeywell Minicomputer  
Sales and Support



**BOUDREAU COMPUTER SERVICES**  
100 Bearfoot Road.  
Northboro, MA 01532  
(508) 393-8839  
FAX 508-393-3781

**DEC-IBM  
BUY / SELL**

VAXs  
MICROVAX II, III SYSTEMS  
IBM S/36, S/38, 43XX, 30XX,  
AS400 • PERIPHERALS  
IBM XT, AT, PS/2  
ALL MICROS  
IBM AT 339s (New & Refurb)  
IBM 3174 51Rs (New & Refurb)  
ALL KEY, PBX & Telecom EQPT.  
**LINK PROCESSOR**

603 E. Town St.  
Columbus, OH 43215  
Phone: 614-464-1638  
FAX: 614-239-8386



- Data General • Fujitsu
- Data Products • CDC
- Printronix • Zetaco

**BUY SELL TRADE**

**(617) 982-9664  
FAX: (617) 871-4456**

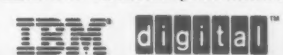
**We buy, sell, lease & rent  
quality new and used equipment.  
And we stand behind it for a year.**

<b>RA82-AA</b> 622 MB Storage Array New 1yr Warranty \$11,950.00 <b>SA482-AA</b> 2.488GB Storage Array New 1yr Warranty \$48,500.	<b>LA210-AA</b> 240 CPS Matrix Printer (Recond.) \$385.00 <b>LA100-AA</b> 240 CPS Matrix Printer (Recond.) \$399.00	<b>HSC57-BA</b> SDI Disk Drive Controller New \$8995.00 <b>HSC50-AA</b> CALL <b>HSC70-AA</b> CALL
<b>PDP 11/23</b> 11/24 11/73 11/83 11/84 All Configured to Your Needs....	Wanted Sun Microsystems & IBM Computer Equipment. Any System, any Configuration	<b>PRO 325</b> Complete With Hard Drive \$425.00 <b>RAINBOW 100-A</b> Complete Systems \$199.00
We Pay Cash for New, Used, and Obsolete Surplus DEC Equipment	<b>SA800-FA</b> 2.4 GB Storage Array New 1yr Warranty \$57,500.00	<b>IBM 3179 M100</b> CRT Terminals \$1,000.00 <b>IBM 3380 Drives</b> All Models Call...



**Phone: 603-886-0383  
Fax: 603-886-0914**

**375A WEST HOLLIS ST. NASHUA, NH 03061**



**Northeast Terminal & Computer Services**

Box 330, Danvers, MA 01923 800-448-8888 (617) 757-0670 FAX (617) 757-1036

'NEW'	REFURB	REPAIR	REPAIR
VT220 Call 350	LA50 325	Zenith PC Call	
VT320 450	LA75 675	IBM PC Call	
VT330 1855	VT100 150	DEC Crsh, Wyse, Dume,	
VT340 2450	VT101 175	Leas/Slagier	
LA120 Call 595+	VT102 195	TVI CRT's 100	
LA100 995	VT103 375	Most Printers 125	
LA210 1450	VT131 195	Most Keyboards 65	
WY50 445	CT101 125	LA120 (PS) 95	
WY60 495	CT101E 175	LA130 (LS) 95	
WY75 595	CT220+ w/o kbd 150	LA210 (PS) 75	
WY85 625	TVI1950 195	LA210 (LS) 95	
Venitech Call 375	TVI1921 195	Hard disks Call	
	Visual 241 Call		

**Southeast Terminal Corporation**

Box 8529, Hobe Sound FL 33475, 800-633-5887, (407) 948-1112, FAX (407) 948-1137  
Depot Repairs, Upgrades, Modules, Leases, On-Site Maintenance, 24 Hour Turnaround

**Used/Lease/Rent**

**CALL US LAST**

GET YOUR BEST PRICE  
Then Call  
**SPECTRA PRODUCTS, INC.**  
For The Best DEAL  
WE  
Buy - Sell - Lease - Rent  
IBM and DEC™ SYSTEMS  
NEW and USED  
Other Services Available  
Installation and Maintenance  
Contract Programming

Call 800-238-6405  
IN TN 901-754-6500

**SPECTRA PRODUCTS, INC.**  
1669 KIRBY PKWY. MEMPHIS, TN 38119

"SINCE 1974"

Formerly Computer Brokers, Inc.

**BUY OR SELL  
NEW OR USED**

IBM PC \* XT \* AT \* PS/2  
COMPAQ \* HP \* AT&T \* WANG  
MACINTOSH \* APPLE 2

1-800-262-6399

**Boston  
Computer  
Exchange  
Corporation**  
MA 617-542-4414  
FAX 617-542-8849



**BUY, SELL  
LEASE  
IBM CPU's**

3081's, 3083's,  
3084-QXX, 3090  
PILLAR SILENT BLOCK,  
PARALLEL CABINET

**GTEX Financial Group**  
(214) 783-1212

CDLA

Est. 1978

**RT  
937X  
Series/1  
AS/400  
System 36, 38  
4300**

Buy, Sell, Lease, Rent

**612-942-9830**

All IBM Machines and Parts

**DATA TREND, Inc.**

10250 Valley View Road  
Suite 140  
Eden Prairie, Minnesota 55344

**Computerworld's Classified Marketplace**

gives you reach to over 612,000 potential buyers!

For more information, call:

**800/343-6474**

or (in MA, 508/879-0700)

**BUY-SELL-LEASE**



**43XX  
3380 DASD  
3480 TAPES  
System 36/38**

Immediate Delivery  
Warranted to Qualify  
for Manufacturer's  
Maintenance

**GLOBAL  
COMPUTER  
CORPORATION**

4620 Sunbelt Drive  
Dallas, Texas 75248-1833

**214/931-3083**

FAX 214/931-8562

**PRIME**

EXPERIENCED  
SYSTEMS AND  
PERIPHERALS

BUY-SELL-LEASE-BROKERAGE

NEW PLUG-COMPATIBLE  
DISK, TAPE, MEMORY

PLUS  
THE FASTEST I/O  
AVAILABLE ANYWHERE

1ST SOLUTIONS, INC.  
11480 N CAVE CREEK ROAD  
PHOENIX, AZ 85020  
602-997-0997

ASK FOR DON SHIFRIS

**WANTED**

**OBSOLETE  
AND EXCESS  
COMPUTER  
EQUIPMENT**

**Top Cash Paid**

We purchase all types of obsolete  
or excess computer equipment  
and peripherals. We pay costs for  
all shipments as well as top prices.

Call today for a quote  
on your system.

**COMPU-SCRAP, Inc.**  
Randolph, MA 02368  
(617) 341-2695  
Call Collect

**NORTHEAST MINICOMPUTER, INC.**  
55 High Street, Unit 6  
Billerica, MA 01862

Wants to Buy Your Surplus  
DEC Computer Equipment

We Pay Cash for Your  
Unwanted Computer,  
Peripherals, Options,  
Memory, and Terminals.

Call 1-800-343-8302

or in Mass.

1-508-683-2550.

Or Fax Your List

1-508-557-0718

**Turn Your excess inventory  
into Cash \$\$\$**



IF YOU'RE BUYING, WE'RE SELLING



IF YOU'RE SELLING, WE'RE BUYING

IBM SYSTEMS  
Buy • Sell • Lease PERIPHERALS

**(800) 331-8283**

TOLL FREE

**(213) 394-1561**

CALIFORNIA

**Ocean Computers, Inc.**  
919 Santa Monica Blvd., Ste. 200  
Santa Monica, CA 90401

**DATA ENTRY  
KEY DISK**

REI  
Carton Systems  
Terminals - Tape Drives  
CPU Units

**AVAILABLE NOW**

**Spencer  
Gifts**

Call Rich Eidell

**(609) 645-5545**

**NEW**

**IBM 9370**

9375 Central processor 8MB  
(4) 9335 disk drives (B) - 3 gigabytes  
(2) 9335 disk controllers (A)  
(2) 9309 racks (CPU and disk)  
4245 printer - 2000 LPM  
(5) 3299 terminal multi plexor  
(38) 3181 CRT terminals  
(2) 3420 tape drives  
3803 tape controller  
Under IBM Maintenance  
Available immediately  
**(404) 955-5525**

**FOR SALE**

**Honeywell  
DPS 7000**

8mb, 4 500mb disks,  
1600/6250 tape drive,  
900 LPM printer w/power stacker,  
3MBU, data net 8/05.

For more information call:

**(314) 361-3600**

Ask for C. Bagley

**BURROUGHS  
UNISYS**

B20 - B7000

A Series - V Series

All Peripherals

**Low Lease Rates**

**Depot Maintenance**

LDI/  
COMPUTER PROVISIONS  
CORPORATION

**(216) 687-0307**

**AS/400  
S/38 S/36**

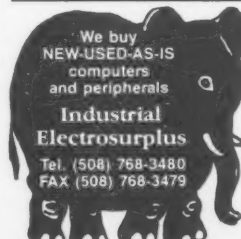
Upgrades - Features  
Displays - Printers

**GENICOM  
PRINTERS**

Twinax - Coax  
Faster than IBM -  
- 40% Less Cost

**QUICK DELIVERY  
BEST PRICE  
TOLL-FREE HOTLINE**

LeasPak International  
1-800-532-7725



**IBM**

36 38 4300  
DISPLAYWRITERS  
DEC

**WANG**

**XEROX**

Printers • Terminals • Disk's  
**LRK RESOURCES  
UNLTD INC.**

713-437-7379  
FAX 713 437-4945 800-523-8903

**Computerworld's  
Classified Marketplace  
gives you buyers with  
extensive purchase influence.**

That's because Computerworld's Classified Marketplace reaches MIS/DP professionals who have extensive involvement in volume purchasing. In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more information, call

**800/343-6474**

(in MA, 508/879-0700)

## Time/Services

CONTRACT SOFTWARE  
WORK AVAILABLE

Boston Area

Ada - Assembler - Basic - C,  
- Cobol - Pascal - PLI, etc.File and Database Systems, SQL,  
Communication - Kermit,  
Interactive Forms DisplayContact:  
Bruce Donaldson  
**Lionel Software**  
108 Fox Hill Street  
Westwood, MA 02090

## DATA CONVERSION SERVICES,

and a whole lot more

O Data conversion on several  
formats and mediums (Tape &  
Disk)O Data Entry: Large and small  
volumes (Tapes, Cards &  
Diskettes)O Professional Technical  
Staff which allows for  
specialized conversion  
servicesO Systems Integration  
Division with expertise  
in application software  
development and conversionO National distributor of an inter-  
active accounting software  
package for IBM compatibles  
O cost effective and responsive  
service to customer needs  
O over 20 years in the data  
entry and data conversion  
industry  
O more than 10 years  
in systems integrationCall today for more information  
530 Warren St., Boston MA 02121 (617) 445-6100  
**MANASSA SYSTEMS**CONVERSION  
SPECIALISTSAUTOMATED  
CONVERSIONS  
TAILORED  
TO YOUR NEEDSDOS to MVS  
HONEYWELL to IBM  
MACRO TO COMMAND  
RPG to COBOL  
ASSEMBLER TO COBOL  
PL1 TO COBOL  
OTHER LANGUAGE/  
SOFTWARE CONVERSIONS**BELCASTRO COMPUTER SERVICES**120 MILLCREEK RD. NILES, OH 44446  
(800) 521-2861

## CONVERTING?

Honeywell to IBM  
Assembler to Cobol  
CICS Macro to Command  
DOS to MVS  
Any Cobol to any CobolProfessional staff,  
experienced in conversion.

Specific methodologies for:

- Conversion Project Management
- Feasibility & Planning
- Technical Conversion

**NEOSYNETICS, INC.**  
3158 Des Plaines Avenue  
Des Plaines, Illinois 60018  
312/299-0900

## DEC - 20

We run your programs  
while you  
work on the future.**LANDART SYSTEMS, INC.**  
65 Broadway, NY, NY 10006

212-363-3170

## DATA CONVERSION

- Optical Scanning
- Disk Conversions
- Tape Conversions

Impressive service at  
Impressive prices!Call:  
800-426-3776 or 502-426-9448**TROPUS, Inc.**  
3704 Hillsboro Rd., Louisville, KYCOMPUTER  
SERVICESMVS/XA VM/SP  
ISPF/PDF CMS  
IMS SAS  
CICS FOCUS  
DB2/QMF INQUIRETYMNET  
LASER PRINTING  
(415) 768-1617BECHTEL  
INFORMATION SERVICESNEW AND USED  
RAISED  
FLOORINGImmediate Delivery  
Quality Installation**Raised Computer Floors**  
One Charles Street  
Westwood, NJ 07675  
(201) 666-8200  
FAX (201) 666-3743

## MIS

SUCCESS WITHOUT  
STRESSNATIONWIDE REMOTE  
COMPUTING SERVICES

- Fixed Price Computing
- Remote Facilities Management
- General Time-sharing Services
- Image/Forms Design and Laser Printing
- Integrated Financial Applications
- Major Third Party Software Packages
- Micro/Mainframe Applications
- Nationwide Network
- Operating System Conversions
- Overflow Processing

**DATA CENTERS:**  
Boston, MA  
Los Angeles, CA  
Washington, DCCALL 1 800 PLAN LCS  
1 800 752-6527

## Litton

Computer Services

ON-LINE WITH  
COMPUSOURCE

- ▲ Multiple centers
- ▲ MVS, VM, DOS
- ▲ RACF, CICS, IMS
- ▲ Decision support software including SAS
- ▲ Volume and term discounts
- ▲ Worldwide access
- ▲ Full technical support
- ▲ Laser printing
- ▲ Disaster recovery services

**COMPUSOURCE**  
(919) 469-3325

Innovative Computer Techniques

## COMPUTER SERVICES

IBM 3084

- Batch Processing • Public Network Access
- Timesharing • Laser Printing

Route 203, Raritan, N.J. 08869

201-885-3400

Contact: Joyce Bogachenko

COST-EFFECTIVE  
COMPUTING  
SERVICES for  
TODAY and ...  
TOMORROW**COMDISCO  
COMPUTING  
SERVICES CORP.**  
provides you with  
low-cost, state-of-  
the-art computing  
services.

- IBM® CPUs and Peripherals
  - Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
  - Application Software: Database Management, Application Development, 4/GLS, Statistical Analysis, Graphics
  - Multiple Communications Methods
  - Technical Support
  - Pricing to fit your needs
- IBM is a registered trademark of International Business Machines Corporation

For more information  
Call Jeff Daum  
**201-896-2030**

## COMDISCO

**COMDISCO COMPUTING  
SERVICES CORP.**  
P.O. Box 26  
Carlstadt, NJ 07072

## NEW!

**IBM MVS-ESA  
Test and  
Development  
Center**

- IBM 3090/300E - PR/SM
- IBM 3090/120E - Standalone
- Destructive Testing
- Major Databases - DB2, IMS
- Worldwide Network
- Early Release Site

**Remote Computing  
Services**  
24 Hours/  
7 days a Week

- Dual 3090s - MVS/XA, VM/XA
- DEC-VAX, Wang/VS, HP3000
- Extensive Software Available
- Application Proc'ing
- Cost Effective

**INET****INFORMATION NETWORK  
CORPORATION**For More Information And  
Pricing Call  
1-800-222-1590, Ext 372It's the  
CLASSIFIED  
MARKETPLACEReach Computer  
Professionals  
Where They Shop For:

- ☐ Used/Lease/Rent
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/  
Supplies
- ☐ Communications
- ☐ Graphics/Desktop  
Publishing
- ☐ Time/Services
- ☐ Bids/Proposals/  
Real Estate
- ☐ Business  
Opportunities

## CALL NOW

(800) 343-6474

(In MA., (508) 879-0700)

**COMPUTERWORLD  
CLASSIFIED MARKETPLACE**  
Where all computer buyers and sellers can go to market.Computerworld's Classified Marketplace  
gives you buyers with  
extensive purchase influence.

That's because Computerworld's Classified Marketplace reaches MIS/DP professionals who have extensive involvement in volume purchasing. In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474 (in MA, 508/879-0700)



# CLASSIFIED

## Hardware

### AN EASY WAY TO BUY AT&T EQUIPMENT



### WORLD COMPUTERS

800-635-0786  
In NY 516-584-8060

#### AT&T WORKGROUP SYSTEMS

6286 WGS	1319
6312 WGS	1639
6386/16 WGS	CALL
6386/20 WGS	CALL
6300 WGS	CALL

SAVE UP TO 40%

OVERNIGHT DELIVERY

AT&T is a registered trademark of American Telephone & Telegraph.

### WITH 386 PRICES LIKE OURS WHY SETTLE FOR A 286

20/16MHz 386SX 16-bit Mono System/40MB (28ms) HD	\$1,899.95
24/20MHz 386 32-bit Mono System/65MB (28ms) HD	\$2,699.95
30/24MHz 386 32-bit Mono System/65MB (28ms) HD	\$2,999.95

#### 1024x768 VGA System

##### Includes:

32.5/25MHz 386 with 2MB RAM	387-20 coprocessor
80MB Hard Drive (28ms)	1.2MB/1.44MB Floppies
Dual Serial/Parallel Ports	Tower Case
Mouse	101-Key KB

Seiko 1430 Dual-Sync Monitor with .28 dot  
1024x768 16-bit STB VGA/EM adapter

#### And 1-Year Warranty

\$5,499.95

Call (508) 820-0335, Or Write:

#### NCC

46 Singletary Lane  
Framingham, MA 01701

## BUY SELL LEASE DEC/VAX

CALL  
LDI/  
COMPUTER  
PROVISIONS

Lou Vascek  
(216) 687-0307

Your Used computer equipment deserves a second chance. If you have used computer equipment to sell, Computerworld's Classified Marketplace is the best place to do your selling. That's because the Classified Marketplace features a Used/Lease/Rent section to help you market your equipment to the very people who are looking to buy.

And when you advertise in Computerworld Classified Marketplace, you reach a total (ABC-audited) audience of over 612,000 computer professionals who turn to Computerworld for news, information, features - and the Classified Marketplace - every week.

So give your used computer equipment a second chance today. Call 800/343-6474 (in MA, 508/879-0700) to reserve your space.

## Software

### FREE BUYER'S GUIDE

When you need programmer's development tools, Programmer's Connection is your best one-stop source. We are an independent dealer representing more than 300 manufacturers with over 800 software products for IBM personal computers and compatibles including: COBOL, compilers and utilities, relational databases, and much more. Call today to receive a FREE comprehensive Buyer's Guide, and find out why Programmer's Connection is your best connection for software tools.

#### Programmer's Connection

7249 Whipple Ave NW  
North Canton, Ohio 44720

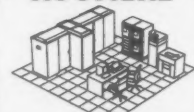
US 800-336-1166  
Canada 800-225-1166  
International 216-494-3781  
FAX 216-494-5260  
Telex 9102406879

Computerworld's  
Classified Marketplace  
needs only 6 days  
notice to run your ad!

### MVS PRODUCTS/IDEAS

Major software developer/market is interested in acquiring or representing high quality MVS, MVS/CA, CICS, TSO, VSAM, DASD performance/productivity optimizing software utilities, products or new ideas. We invite responses in absolute confidence to Box 35570 Monte Sereno, CA 95030

### ROOMER2



Create computer room layouts and 3D views with your IBM PC or compatible. New library of computer components makes it quick and easy. From \$295. Call for free brochure Money Back Guarantee

Multiplan Software • PO Box 747  
Clanton, PA 16814 • (814) 226-5606

## Bids/Proposals/Real Estate

### STATE OF CONNECTICUT D.A.S. BUREAU OF PURCHASES

#### REQUEST FOR PROPOSAL (RFP)

To provide a turnkey, industrial grade, Shop Floor Computer Integrated Manufacturing System for educational use. Major components to include Flexible Manufacturing Line; Automatic Storage and Retrieval System; CNC Workcell with Articulate Robot, CNC Lathe, and CNC Mill; Pick-and-place Pneumatic Workcell; Vertical Assembly Workcell; Bar-code and Vision Systems; and associated software, training material (system & cell experiments), and support.

Interested vendors should specify the above reference number and contact:

Resources and Facilities Planning  
340 Capitol Avenue, 1st Floor  
Hartford, CT 06106

(203) 566-3304

JOHN W. OTTERBEIN  
DEPUTY COMMISSIONER

### NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSAL

The New York City Housing Authority requests proposals for professional data processing services for Assistance with the Migration of Computer Applications from DOS/VSE to MVS/CA. Your firm must have a proven record of timely and cost effective DOS to MVS conversions with Fortune 500 companies and/or large government agencies.

If you can fulfill these requirements and provide the necessary experience, expertise and software, you are encouraged to obtain a copy of the RFP between 9:30 A.M. and 4:30 P.M. beginning Monday, April 3, 1989 from:

Paul Barker  
Deputy Director S&CS  
New York City Housing Authority  
250 Broadway Room 1221  
New York, New York 10007  
(212) 306-3285

An indication of intent to respond must be received by April 12, 1989.

A Pre-Bidders Conference will be held on Friday, April 14, 1989 in the Authority's Ceremonial Room, Room 1010A at 2:00 P.M. All questions must be received no later than 5:00 P.M. on Thursday, April 13, 1989.

Proposals in response to the RFP must be returned to the above office no later than 5:00 P.M. on Thursday, April 27, 1989 to be considered.

## Graphics/Desktop Publishing

### COMPUTER DATA DISPLAYS PC Screen to Large Screen

Look to BOXLIGHT—The LCD Specialist—For the Right System to Meet Your Needs.

### KODAK DATASHOW

+Eiki, Apollo, Chisholm and others.

Prices start at

\$599

Solutions for VGA, EGA, CGA,  
all MACs & more  
M/C, VISA, AMEX & COD

### BOXLIGHT CORPORATION

(415) 892-4744

Computer-Based Presentation Systems  
Since 1984

### Computerworld's Classified Marketplace

delivers your  
message to  
companies that plan  
to buy your  
product or service.

From PCs to minis, mainframes to supercomputers, Computerworld's readers buy products across all ranges of today's computers. So if you're selling, advertise in the newspaper that delivers readers that plan to buy YOUR product or service. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474

(in MA, 508/879-0700).

## Peripherals/Supplies

### GENUINE HEWLETT PACKARD TONERS

\$79.50  
Save 10% off retail  
Original \$89.50

Huge inventory in Stock  
For Same Day Shipment Call  
1-800-22-TONER  
1-800-228-6637  
Printer Supplies At Similar Savings  
TONERS PLUS...

### COMPUTERWORLD'S Classified MARKETPLACE

Examines the issues while  
Computer Professionals  
examine your message.

Call for all  
the details.

(800) 343-6474

In MA,

(508) 879-0700

## Business Opportunities

### How can you realize your mind's potential?

Discover and use  
Dianetics® the totally  
practical science of the mind,  
by L. Ron Hubbard. Order  
your copy today. Call now:  
1 (800) 367-8788

Dianetics® is a registered trademark.

### Computerworld's Classified Marketplace

delivers your  
message to  
companies that plan  
to buy your  
product or service.

From PCs to minis, mainframes to supercomputers, Computerworld's readers buy products across all ranges of today's computers. So if you're selling, advertise in the newspaper that delivers readers that plan to buy YOUR product or service. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474

(in MA, 508/879-0700).



# TRAINING

## How we can invest in our own

*DP organizations can play key role in fostering computer literacy in society*

BY EDMOND DROUIN  
SPECIAL TO C&W

Studies continue to show a decline in math and science skills in the U.S. compared with other industrialized nations. This decline will hurt all U.S. business in the 1990s and into the 21st century.

Part of this problem's solution is to improve the quality of ongoing training for teachers. Another part is supplying support materials. The business community can, and should, begin to share in this effort.

In 1986, John Lampros, a programmer at Liberty Mutual Insurance Co., stopped in to see me in my capacity as the firm's director of data processing education. He explained that his wife Sharon, a high school math teacher, had been appointed to the position of computer instructor but had little computer background. He wondered if I would meet with her to help.

Before Sharon left my office, I lent her videotapes, film strips, computer periodicals and a copy of a computer-fundamentals text we use in classes.

Over the next few weeks, Sharon evaluated more material, and I ordered videotapes for her from a library firm. I found I could lend a lot of our own material, much of which was idle 75% of the time. I offered tours of our

company computer operations and held classes on computer careers for groups of students.

Throughout that year, my approach was to be a helpful partner. An important point should be stressed here: Help of this nature should be defined by the recipient. Schools might understandably suspect corporate helpers of pursuing their own, perhaps hidden, agenda.

### Building partnerships

During spring 1987, I became involved with an effort by the Portsmouth, N.H., Chamber of Commerce to improve partnerships between businesses and schools. Two of us on a committee proposed expanding my work to other schools.

We surveyed 26 high schools to identify needs and available resources. We also asked if computer teachers would benefit from a summer workshop.

We found teachers of computer classes possessed little background or training, encountered difficulties motivating some students and lacked both equipment and help from companies or outside individuals. There was support for the workshop, though many teachers were unsure of their precise needs.

We came to several conclusions that formed the foundation for our program. First, equip-

ment needs were beyond our capacity, and besides, we believed citizens should fund the schools. There was also no way to bring about a compatible mix of equipment. We would have to work with the present diversity, though incompatible operating systems limited use of comput-

**T** EACHERS OF computer classes possessed little background or training, encountered difficulties motivating some students and lacked both equipment and help from companies or outside individuals.

er-based training.

Teachers' training needs were considerable, and we could help to meet them in a variety of ways. This effort became the basic thrust of our program. Finally, some support materials could be provided to schools on generic computer issues such as basic concepts, security and careers.

We quickly found that many group members moved away from a commitment because of lack of time, money or skill. Our committee started with seven or eight company representatives, but when it came to doing work and funding the effort, only two were left. Data General Corp. contributed money to fund a

lending library of support materials.

I met with my training staff to discuss the project, and several members agreed to design and teach modules. I offered each a pair of half-days off — modest rewards in a tight system. I believe people worked on the program because they cared about the teachers and about sharing knowledge and skills.

In addition, my superior, the manager of DP administration, agreed to let us use company

classrooms and equipment. He also agreed to hire Sharon Lampros on a part-time, temporary basis to help us develop the resource library and the teacher-training program.

We decided teachers should learn more about how computers are used to show students types of jobs and skills they would need. I arranged for organizations such as Portsmouth Regional Hospital and Pease Air Force Base to provide tours and explain their use of computers.

We conducted the 4½-day workshop during August for 18 teachers from 13 districts. Mornings were devoted to discussions and hands-on practice.

The tours took place in the afternoons, with the host providing lunches.

There was no cost to teachers or their school districts, except for those teachers who gave up a week of summer employment. We provided teachers with certificates of completion that helped satisfy development requirements in their districts.

The workshop covered computer concepts such as databases, including hands-on use of IBM's DB2 and SQL; electronic mail, with use of two leading systems; networking; personal computers; expert systems and decision-support systems; design and construction of computers; legal implications of PC software; and future trends.

In spring 1988, members of the New Hampshire High-Tech Council contacted me about expanding the project. A meeting led to a second workshop last August for 22 teachers.

This idea of computer professionals assisting school systems has only begun to move through society, but the potential for DP professionals to help is real.

We are not merely hidden hackers in a quiet corner of society. With our education and prosperity, we enjoy the benefits of our society. Let us share our knowledge and experience with others. Full membership in society means not only taking but sharing.

Drouin is director of DP Education & Training at Liberty Mutual Insurance Co. in Portsmouth, N.H.

## Computerworld

### Training Editorial Schedule

- April 3 -** DP Training Organizations & the Public School Market.
- April 10 -** Developing an Automated Management System.
- April 17 -** Evaluating Training Vendors.
- April 24 -** Preparing the RFP for Training Services.
- May 1 -** Training the Experienced with a New Environment.
- May 8 -** Assessing Training Needs Based on Changes in Technology and the Workforce.



## SUPERB VIDEO COURSES AT MAIL-ORDER PRICES

A Treasury of Top-Notch Training for Microcomputer, Mainframe and MIS Shops

Intro to PS/2	MVS JES2	Structured COBOL
Lotus 1-2-3	CICS/VS	Project Management
dBASE	TSO/SPF	Distributed Systems
WordPerfect	OS/VSAM	Data Communications
Enable	DOS/VSX JCL	Structured Systems
PASCAL	IMS	Analysis & Design
Assembler	VM/CMS	Computer Literacy

Over 50 courses to increase productivity and reduce costs. Simple, flexible, and reliable VHS video with workbooks. Interactive Videodisc, U-Matic and BETA formats available.

FOR A FREE CATALOG CONTACT: (212) 652-7171



**EDUTRONICS**  
Learning Systems  
80 Wall Street,  
New York, NY 10005

Additional 15% Discount on your First Course

## Computerworld's Training Pages

gives you the opportunity to reach over 612,000 potential attendees for your seminar/conference!

For more information, call:  
**800/343-6474**  
or (in MA, 508/879-0700)

Still creating CBT  
the old fashioned  
way...Slowly?



Find out why  
courseware authors are  
switching to the PROPI  
Authoring System. Flow-  
chart course strategy.  
Use interactive editors  
for screen design,  
video support, and  
record keeping.

Write ASYS,  
104 Viewcrest,  
Bellingham, WA 98225  
or call (206) 734-2553

# FREE

## Computer Training

Today's best software programs are worthless until you know how to use them. With ATT's computer-based training, you can learn a new software program right on your computer. In half the time it used to take.

Call or write today to get a FREE 5¼" diskette with 15-20 minutes of computer-based training on: (choose only one)

☐ dBASE IV ☐ Lotus 1-2-3 ☐ Word Perfect 5.0

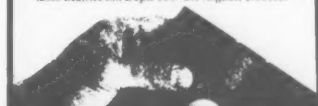
Call: **1-800-421-4827** (Dept. 100)

or 1-213-823-1129 (in CA)

Or mail your request to:

**ATI** American  
Training  
International

12538 Beatrice St., Dept. 100 Los Angeles, CA 90066

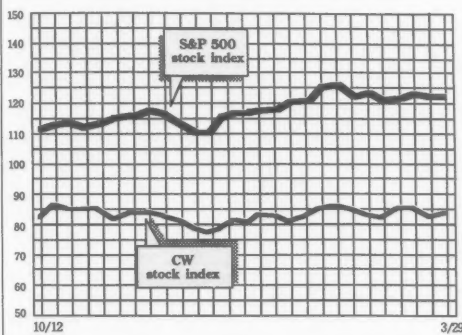


## Computerworld's Training Section

only needs 6 days notice to run your ad!



# STOCK TRADING INDEX

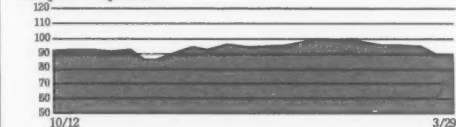


Indexes	Last Week	This Week
Communications	104.3	104.1
Computer Systems	89.8	90.0
Software & DP Services	110.4	111.5
Semiconductors	52.3	52.9
Peripherals & Subsystems	77.5	78.1
Leasing Companies	106.2	112.9
Composite Index	83.5	84.8
S&P 500 Index	122.8	122.9

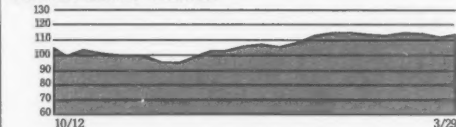
## Communications



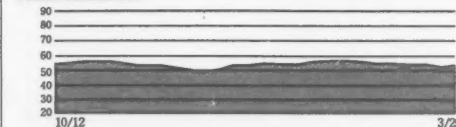
## Computer Systems



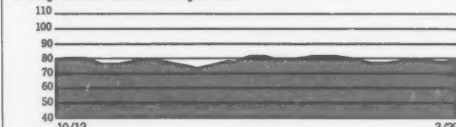
## Software and DP Services



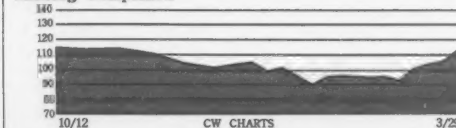
## Semiconductors



## Peripherals and Subsystems



## Leasing Companies



# Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 29, 1989

52-WEEK RANGE (1) PRICE CLOSE MARCH 29, 1989 WEEK NET CHG WEEK PCT CHG

## Communications and Network Services

N AMERICAN INFO TECHS CORP	53	42	50.75	-1.0	-1.9
N ANDREW CORP	22	13	19	-0.8	-3.8
N ARTEL COMM CORP	1	1	3	0.1	4.3
N AT&T	33	24	31.25	-0.3	-0.8
N AVANT GARDE COMP INC	3	0	0.1	-0.1	-20.0
N AVANTER INC	8	4	5.25	0.3	5.0
N AYDIN CORP	17	13	15.5	0.0	0.0
N BELL ATLANTIC CORP	76	64	75.75	0.5	0.7
N BELL SOUTH CORP	44	37	42	0.4	0.9
N COMPRESSION LABS INC	5	3	4.75	0.0	0.0
N COMPUTER NETWORK TECH	2	1	1.532	0.0	-2.0
N CONTEL CORP	51	31	50.38	1.0	2.0
N DATA SWITCH CORP	9	5	5.125	0.1	2.5
N DIGITAL COMM ASSOC	38	17	18.625	-0.1	-0.7
N DYNATECH CORP	24	17	18.25	0.0	0.0
N FIBRONICS INTERNATIONAL INC	5	3	4.375	0.1	2.9
N GANDOLF TECHNOLOGIES	4	4	3.875	-0.5	-11.4
N GENERAL DATACOMM INDS	6	3	5.5	0.3	5.5
N GTE CORP	48	34	45.375	-0.6	-1.4
N INFOTRON SYS CORP	14	0	1.0	0.5	5.3
N ITT CORP	56	44	51.75	0.8	1.5
N M A COM INC	11	8	7.625	0.0	0.0
N MIC COMMUNICATIONS CORP	29	11	28.875	2.5	9.5
N NETWORK EQUIPMENT TECH INC	22	14	20.5	0.8	3.8
N NETWORK SYS CORP	12	8	9.75	-0.4	-3.7
N NORTHERN TELECOM LTD	20	15	14.875	-0.3	-1.7
N NOVELL INC	38	19	30.125	-1.1	-3.6
N NYNEX CORP	71	61	69.625	-0.4	-0.5
N PACIFIC TELECOM GROUP	36	21	34.875	0.3	0.8
N PENRIL CORP	5	4	4.25	-0.3	-5.6
N PLESSEY PLC	48	25	43.125	-0.4	-0.9
N SCIENTIFIC ATLANTA INC	16	10	14.625	0.5	3.4
N SOUTHWESTERN BELL CORP	46	34	45	0.6	1.4
N 3 COM CORP	28	16	28.25	1.1	4.5
N U S WEST INC	83	50	62.5	1.5	2.5

## Computer Systems

Q ALLIANT COMPUTER SYS	8	3	3.25	-0.1	-3.7
Q ALPHA MICROSYSTEMS	8	4	6.75	-0.3	-3.6
Q ALTOS COMPUTER SYS	11	6	6.75	0.6	10.2
Q AMDAHL CORP	20	15	17	0.3	1.6
Q APOLLO COMPUTER INC	17	7	7.75	-0.1	-1.6
Q APPLE COMPUTER INC	48	34	34.25	0.5	1.5
Q BOLT BERANEK & NEWMAN	37	9	3.75	0.3	7.7
Q BRITTON LEE INC	4	2	2.813	-0.1	-2.2
Q COMPAQ COMPUTER CORP	76	47	66.75	1.8	2.4
Q COMPUTER AUTOMATION INC	13	3	4.5	0.3	6.7
Q CONCURRENT COMP CORP	6	4	4.75	-0.3	-5.0
Q CONTROL DATA CORP	28	16	20.625	0.3	1.2
Q CONVEX COMPUTER CORP	11	7	9.75	-0.3	-3.0
Q CRAY RES INC	89	53	54.75	-1.0	-1.8
Q DAISY SYS CORP	12	4	4.25	0.1	3.0
Q DATA GEN INC	12	15	15.625	0.3	1.7
Q DATAPART CORP	6	4	3.8	-0.3	-6.7
Q DELL COMPUTER CORP	13	7	7.125	0.3	3.6
Q DIGITAL EQUIP CORP	122	86	99	2.6	2.7
Q FLOATING POINT SYS INC	5	2	2.75	0.1	4.8
Q HARRIS CORP	32	25	27.75	-0.1	-0.4
Q HEWLETT PACKARD CO	68	44	50.75	-1.3	-2.6
Q HONEYWELL INC	77	57	65.125	0.8	1.2
Q IBM	131	105	109.625	0.4	0.3
Q INFORMATION INTL INC	16	12	15	-0.4	-2.4
Q IPL SYS INC	7	1	8	-0.1	-2.0
Q MAI BASIC FOUR INC	21	7	8.125	0.1	-8.0
Q MATSUSHITA ELEC IND LTD	219	160	184.75	-2.3	-1.2
Q MEGADATA CORP	4	1	1.344	0.0	2.4
Q MENTOR GRAPHICS CORP	37	23	31	0.3	0.8
Q NBI INC	7	1	1.5	0.0	0.0
Q NCR CORP	70	51	65.75	1.8	3.2
Q PRIME COMPUTER INC	21	12	16.625	-0.3	-1.5
Q PYRAMID TECHNOLOGY	20	10	13.5	0.3	1.9
Q SILICON GRAPHICS CORP	25	14	25	-0.4	-1.5
Q STRATUS COMPUTER	32	21	26.5	1.3	5.0
Q SUN MICROSYSTEM INC	21	13	15.875	-0.5	-3.1
Q SYMBOLICS INC	3	1	2	0.1	5.0
Q SEQUENT COMPUTER SYS INC	27	14	23.5	0.4	1.6
Q TANDEM COMPUTERS INC	21	12	17.625	-0.7	-3.9
Q TANDY CORP	49	38	42.625	0.3	0.6
Q ULTIMATE CORP	15	8	9.875	0.0	0.0
Q UNISYS CORP	38	25	26.75	0.0	0.0
Q WANG LABS INC	13	8	8.375	0.0	0.0

## Software & DP Services

Q ADVANCED COMP TECH	4	1	2.75	-0.5	-15.4
Q AMERICAN NGMT SYS INC	19	12	14.625	-0.5	-3.3
Q AMERICAN SOFTWARE INC	21	12	18.875	0.0	0.0
Q ANACOMP INC	12	5	8.125	0.1	2.1
Q ANALYSTS INTL CORP	18	7	17	1.3	7.9
Q ASHTON TATE	30	19	19.75	0.3	1.3
Q ASK COMPUTER SYS INC	18	12	14	-0.5	-3.4
Q AUTODESK INC	34	23	29.25	1.8	6.4
Q AUTO DATA PROCESSING	46	36	36.375	0.3	0.7
Q BMC SOFTWARE INC	17	8	16	-0.6	-3.6
Q BOOLE & BAGGAGE INC	16	8	15.5	0.5	3.3
Q BUSINESSLAND INC	15	6	11.375	0.6	5.6
Q COMPUTER ASSOC INTL INC	40	24	34.75	-0.3	-0.7
Q COMPUTER HORIZONS CORP	12	7	8.125	-0.1	-1.5
Q COMPUTER SCIENCES CORP	58	38	48.125	0.1	0.3
Q CORPORATE SOFTWARE	15	9	9	0.0	0.0
Q COMPUTER TASK GROUP INC	17	10	14.375	-1.0	-6.5
Q COGNOS INC	9	5	7.375	0.5	7.3
Q COMSHARE INC	29	15	26.25	1.3	5.0
Q CULLINET SOFTWARE INC	9	4	5	-0.1	-2.4
Q GENERAL MTRS (CLS E)	47	37	43	0.0	0.0
Q HOGAN SYS INC	6	3	5	0.4	8.1
Q INFORMIX CORP	25	7	10.625	-0.4	-3.4
Q INTELLICORP INC	4	2	3.625	-0.1	-3.3
Q KEANE INC	33	9	31	3.0	10.7
Q LEGENT CORP	24	16	21.75	0.0	0.0
Q LOTUS DEV CORP	26	15	20.25	-0.5	-2.4
Q MAM "EMENT SCI AMER	14	6	9.75	1.0	11.4
Q MICRO PRO INTL CORP	4	2	1.813	-0.1	-6.4
Q MICROSOFT CORP	71	45	49.5	0.5	1.0
Q MORINO ASSOCIATES INC	20	12	20	0.0	0.0
Q NATIONAL DATA CORP	31	19	26.625	-0.4	-1.4
Q ON LINE SOFTWARE INTL INC	11	4	6	0.4	6.9
Q ORACLE SYS INC	26	15	24.375	2.1	9.6
Q PARSOPIC SYS INC	18	12	18.25	1.0	6.6
Q PHOENIX TECHNOLOGIES INC	19	12	16	0.3	1.6
Q POLICY MGMT SYS CORP	27	21	22.25	0.0	0.0
Q PROGRAMMING & SYS INC	18	10	17	0.0	0.0
Q RABBIT SOFTWARE INC	3	2	1.75	-0.1	-6.7
Q RELATIONAL TECHNOLOGY INC	21	12	13	-0.4	-2.8
Q REYNOLDS & REYNOLDS CO	28	17	27.125	1.1	4.3
Q SEI CORP	22	16	16.625	-0.1	-0.7
Q SHARED MED SYS CORP	26	14	18	-0.1	-0.7
Q SAGE SOFTWARE INC	10	5	6.625	-0.3	-3.0
Q SOFTWARE PUBLG CORP	27	14	17.125	0.5	3.0
Q STERLING SOFTWARE INC	9	5	6.125	0.5	8.9

Q SUNGARD DATA SYS INC	20	13	13.25	-0.5	-3.6
Q SYSTEMATICS INC	35	26	34.25	0.0	0.0
Q SYSTEM CENTER INC	21	12	18.875	-1.4	-6.8
N SYS. SOFT INC	26	9	20.25	1.0	5.2

## Semiconductors

N ADV MICRO DEVICES INC	17	7	8.25	0.3	3.1
N ANALOG DEVICES INC	16	10	10.5	0.0	0.0
N ANALOGIC CORP	10	6	9	-0.1	-1.4
N CHIPS & TECHNOLOGIES INC	21	11	18	0.3	1.6
Q INTEL CORP	37	19	24.5	1.1	4.8
Q LSI LOGIC CORP	14	8	9.75	-0.1	-1.3
Q MICRON TECHNOLOGY INC	28	15	18.75	1.1	6.4
N MOTOROLA INC	56	36	40.875	1.0	2.5
N NATL SEMICONDUCTOR	15	7	7.5	-0.1	-1.8
N TEXAS INSTRS INC	55	35	38.25	0.8	2.0
A WESTERN DIGITAL CORP	17	11	11.375	-0.5	-4.2

## Peripherals

Q ALLOY COMP	5	2	2.125	-0.1	-5.6
Q AM INTL INC	6	3	5.625	-0.1	-2.2
Q AST RESH INC	17	7	8.875	0.0	0.0
Q AUTO TROL TECH CORP	6	4	5.25	0.1	2.4
Q BANKTEC INC	12	8	11.625	1.0	9.4
Q CIPHER DATA PRODS INC	11	6	8.75	0.5	6.1
Q COGNITRONICS CORP	5	2	4	0.0	0.0
Q CONNOR PERIPHERALS	10	7	6.625	-0.3	-3.6
Q DATAPRODUCTS CORP	18	9	17	0.3	1.5
Q DATARAM CORP	9	6	8.5	0.4	4.6
Q EASTMAN KODAK CO	50	36	45.125	-0.1	-0.3
Q IAC CORP MASS	15	4	3.75	-0.3	-8.3
Q EMULEX CORP	12	6	9.875	-0.3	-2.5
Q EVANS & SUTHERLAND	21	13	17.25	0.8	4.5
Q ICOT CORP	5	2	2.625	-0.1	-4.5
Q INTERLEAF INC	20	6	9.25	1.1	13.8
Q KOMECA CORP	5	2	2.063	0.1	6.4
Q LEE DATA CORP	4	2	2.563	0.1	2.5
Q MASSOR SYS CORP	4	2	2.125	-0.3	-10.5
Q MAXTOR CORP	16	6	6.625	0.6	7.8
Q MICROPLUS CORP	6	3	6.25	0.0	0.0
Q MINISCORP CORP	14	3	3.888	-0.2	-4.1
Q MINNESOTA MNG & MFG CO	70	57	87.25	-0.6	-0.9
Q PERSONAL COMPUTER	7	4	4.25	-0.3	-5.6
Q PRODUCTS INC	2	1	1.125	0.2	19.9
Q PRAM CORP	11	7	7	0.3	3.7
Q PRINTRONIX INC	12	6	8.25	-0.1	-1.5
Q QUANTUM CORP	17	10	16	0.3	1.6
Q RECOGNITION EQUIP INC	12	6	8.75	-0.3	-8.1
Q REXON INC	9	4	7	0.1	1.8
Q SEAGATE TECHNOLOGY	23	7	11.375	0.9	8.3
Q STOKER DATA CORP	4	1	2	-0.1	-5.9
Q TANDON CORP	3	1	0.875	-0.2	-17.7
N TEKTRONIX INC	28	19	20.75	-0.5	-2.4
N TELEVIDEO SYS INC	10	6	0.375	0.0	0.0
N XEROX CORP	67	50	56.75	-1.0	-1.7

## Leasing Companies

N AMPHILCON INC	20	13	17.75	-0.5	-2.7
Q CAPITAL ASSOCIATES INTER-	9	4	8.875	0.6	7.6
Q NATIONAL INC	26	19	32	0.3	1.1
Q CONCORD INC	8	0	0.875	0.2	27.2
Q CONTINENTAL INFO SYS	17	10	18.25	-0.3	-1.5
Q LDI CORPORATION	3	1	3	0.3	9.7
Q PROCTER AMERIN INC	8	4	7.5	0.5	7.1
Q SELECTERM INC	8	4	7.5	0.5	7.1

EXCHN=NEW YORK(A)=AMERICAN(Q)=NATIONAL

# No fooling

Unusual calm greets the latest Street shock from a tech giant

Those who say Wall Street is populated by nobody but cynics may be far too cynical.

In the wake of the stock devastation wrought by warnings from IBM and Digital Equipment Corp. of lower-than-expected earnings, something more than a blip might have been anticipated after Unisys Corp.'s startling announcement last week that a predicted first-quarter loss could run as high as \$80 million.



# Strong scruples can curb computer crime

BY MICHAEL ALEXANDER  
CW STAFF

BOSTON — The nation's laws governing computer crimes are strong, but its ethics concerning the use of computer technology are weak, according to Larry Potts, chief of the white-collar crimes program at the Federal Bureau of Investigation.

Computers that are easier to

According to Potts, existing laws governing white-collar and computer-related crimes are adequate. "Most computer crimes are traditional crimes; instead of using a knife or gun in the attempt, the criminal uses a computer. What is needed is a reinforcement of ethics," he said.

Too many citizens believe that computer crimes are victimless and that illegally accessing a computer system causes little harm, Potts said. Yet, the same people would never dare to pop the lock off an office door and steal from their boss' desk drawers, he added.

The FBI's top white-collar crime investigator also called for greater cooperation between law enforcement and business in resolving computer crimes. Taking a common-sense approach to security will go a long way toward curbing computer crime, Potts said. As an example, he cited an instance in which

a computer crime was committed after an employee left critical computer passwords and manuals in a trash receptacle outside of a company's computer room.

Potts told the audience that only by improving computer security can business expect to see a reduction in computer crimes. "Prosecution will never be a solution without computer security," he said. "It's like attacking the drug problem by attacking the supply side without addressing the demand side."

**D**espite an alarming upsurge in computer crime, the FBI's white-collar crime unit is not working on boosting its computer skills beyond a rudimentary level.

"There is some concern that the FBI lacks the expertise to investigate computer crimes and that its expertise is limited to watching *War Games* twice," said Larry Potts, chief of the FBI's white-collar-crime program.

"But the development of computer expertise is not a goal of the FBI," Potts said. "Our responsibility is to make evidence understandable to the layperson."

In a keynote address at the Sixth Annual Working Conference for Information Security Professionals in Boston last week, Potts discussed how the FBI handles computer crimes.

Prosecutors must prove their cases beyond a reasonable doubt — a task that is exceedingly difficult with computer crimes, the technical details of which most people find perplexing, Potts explained. When juries do not understand complex issues, defense attorneys seize on their confusion as a gambit to win cases.

Some security industry professionals said that computer crime is given a low priority by the FBI because there are many more compelling crimes that demand their attention.

"It's just not viewed as a serious problem," said Robert Campbell, president of Advance In-

formation Management, Inc. in Woodbridge, Va.

Since 1976, 300 FBI agents have gone through a three-week training course to enhance their ability to investigate computer-related crimes. However, the course makes no attempt to educate them beyond the basics of computer science, Potts said. When computer crimes are beyond the agent's understanding, he is instructed to seek an expert's assistance.

The investigation of computer crimes falls under the jurisdiction of the FBI's white-collar-crime program. This unit, the largest of the FBI's criminal programs, is responsible for investigating a wide range of white-collar crimes, which come under one of three categories: government fraud, corruption of public officials and financial crimes. Computer crime is a subsection of financial crimes. The entire white-collar-crime division has 1,500 agents who are handling 16,000 pending investigations, Potts said.

A new report by the National Center for Computer Crime Data, published last week, pegged the annual costs of computer crimes at \$555,464,000, not including losses of personnel time and computer downtime as a result of computer abuse.

The number of cases pending investigation has gone from 75 in 1986 to "several thousand in 1988," according to Jay Bloombecker, director of the computer crime research center.

MICHAEL ALEXANDER



STELLA JOHNSON

FBI's Potts thinks it's time to get tough

use, their widespread accessibility and the population's growing literacy have "fueled the fire of computer-related crimes," said Potts in a keynote address before an audience of more than 300 information security professionals at the Sixth Annual Working Conference for Information Security Professionals held here last week.

eradicate. It consisted of two parts: a 99-line "probe" written in the C language and a 3,568-line "corpus" that had been compiled into binary machine language. The probe attempted to penetrate a computer and, if successful, compiled and executed itself on the host and then sent for the corpus.

Although the worm was technically sophisticated, it contained several design flaws and programming errors and could have been created by many of the nation's undergraduate and graduate computer science students, the report said.

The commission concluded that Morris probably did not intend for the worm to replicate wildly. However, he reportedly "made only minimal efforts to halt the worm once it had propagated and did not inform any person in a position of responsibility as to the existence and content of the worm."

The worm's release was not "a heroic event that pointed out the weaknesses of operating systems," the report said. "The fact that Unix, in particular [the University of California at Berkeley's] Unix, has many security flaws has been well known."

The commission based its conclusions on evidence found in Morris' computer files and from interviews with computer faculty, computer center staff and graduate students at Cornell and staff and former students at Harvard University, where Morris was an undergraduate.

The commission claimed that three versions of the worm were in Morris' computer files, including one dated Oct. 15, 1988, and two dated Nov. 2, 1988, the day the worm was unleashed. Also in the files were a list of user ID/password combinations to accounts at Cornell and elsewhere and a list of passwords nearly identical to one contained in the

crime is hidden behind a sacred veil."

Harshbarger echoed the call for greater cooperation between law enforcement and business. The resources of local prosecutors are limited, he said. Business must be willing to define the nature of computer crime and to work with law enforcement officials to resolve crimes when they occur. Too often, corporations are reluctant to discuss computer crimes for fear of worrying their customers or suppliers, Harshbarger said.

Computer crime can be

curbed only through education and the resultant change in people's behavior and attitudes. "You must play a lead in defining the ethical framework for the use of technology," he added.

Corporations are taking a more active approach in preaching computer ethics to their employees, said Raymond Humphrey, director of corporate security at Digital Equipment Corp. "Our jobs will get tougher before they get easier," Humphrey said. "Security will be a bigger problem because computer crimes will increase."

## Cornell

CONTINUED FROM PAGE 1

rity weaknesses in Unix to launch his worm, in part because of ambivalent attitudes on the part of Unix vendors and developers.

The report said that commercial Unix vendors have been slow to fix well-known security flaws "because of the laborious procedures that are often followed." Other members of the Unix community are unwilling to point out security flaws for fear that such information would merely highlight the system's vulnerability, the commission added.

The worm, designed to infect computer systems running Unix, especially the University of California at Berkeley's Unix Version 4.3, had four methods of attack and several methods of defense that were intended to make it difficult to pinpoint and

worm, the commission said.

The commission did not attempt to estimate the losses or number of computers infected by the worm but called the Computer Virus Industry Association's estimate of \$96 million "grossly exaggerated" and "self-serving."

### Firm, but fair

The commission concluded that computer scientists seem to favor strong disciplinary measures for this sort of computer crime but not so stern as to damage Morris' career.

Since the incident, Morris has been unavailable for comment and is believed to be staying at his parents' home in Arnold, Md. On advice of his counsel, Morris declined to be interviewed, according to the report's authors.

Thomas Guidoboni, a Washington, D.C., attorney representing Morris, said last week, "The report does not have much

that is new, and a fair amount of it appears to be based on speculation."

Three weeks ago, federal law enforcement officials and Morris' attorney asked Cornell officials to delay release of the report for fear that prejudicial publicity would hinder efforts to assemble an impartial jury if the case is tried [CW, March 20].

Law enforcement officials in Syracuse, N.Y., refused comment on the report's contents but said its release would not hinder the investigation. "We may have been overly anxious to ask them not to release it in the first place," said Andrew Baxter, an assistant U.S. Attorney for the Northern District of New York.

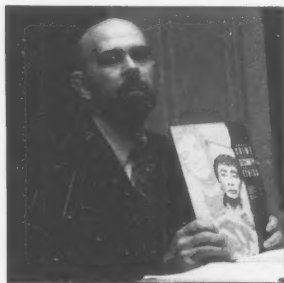
"It will make the selection of an impartial jury difficult, and that is the reason that I asked them not to release the report," Guidoboni said. "Apparently, they are not concerned about his getting a fair trial."



# Hacker stereotypes changing

BY MICHAEL ALEXANDER  
CW STAFF

These days, when law enforcement officials round up the usual suspects following the commission of a computer crime, they are just as apt to get their woman as they are their man. The stereotype of a hacker — a white teenage male who penetrates a



NCCCD's BloomBecker

computer system for the fun of it — no longer fits, according to a study released last week by the National Center for Computer Crime Data (NCCCD), a Los Angeles research firm.

"Computer crime is an equal opportunity employer," said Jay BloomBecker, director of the NCCCD. The results of the survey indicated that women and minorities are increasingly as likely to commit computer crime as young white males.

The knowledge needed to perpetrate computer crimes is spreading rapidly through the population. "Increased access to computers is also increasing computer crimes, not only in the hacker community but across the board," BloomBecker said. The survey found that 32% of those arrested for computer crimes are women, 43% are members of a minority group and 67% are between 21 and 35 years of age.

The report also noted that former and current employees are more likely to breach a company's computer system than students, unemployed criminals, computer professionals and other occupational categories.

"The wise computer security professional will worry less about hackers and more about employees," BloomBecker said.

Computer criminals aim to steal money and services when they break into a computer system electronically, the report said. The two categories make up 70% of computer crimes.

The NCCCD calculated that the costs of computer crime in 1988 exceeded \$555 million. It also estimated that computer abuse caused a loss of 15 computer-years in downtime and required 930 man-years to detect and recover from data alteration, viruses and other computer-related mayhem. The average computer security loss is \$109,000, 26 computer-hours and 365 man-hours, the center added.

While the number of computer crimes is on the rise, so too is the number of arrests

and convictions, the NCCCD pointed out. A canvass of 130 prosecutors' offices throughout 38 states in 1986 turned up only 75 cases of computer crimes. "For 1988, we project several thousand arrests," BloomBecker said.

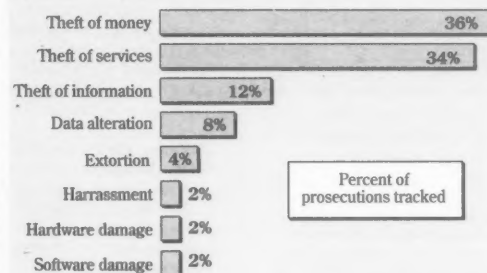
The report noted that in California, where researchers were able to conduct a complete analysis of computer-crime data, 71% of those arrested for computer crimes were convicted. The remaining cases were split evenly between those dismissed by the court and those dropped by law enforcement officials.

"Those results are similar to what we found in our 1986 survey and not dramatically different than what we project nationally," BloomBecker explained. Laws governing computer crimes are also on the upswing, researchers said. In a 1986 survey, the NCCCD counted 35 states that had passed computer-crime laws. In 1988, researchers found 48 states (Vermont and Virginia are the exceptions) with computer-crime laws.

The computer-crime data in the report is based on a survey of prosecutors' offices in the U.S., data on computer-crime prosecutions in New York, California, Pennsylvania and the federal system and media reports. The

## It takes a thief

An analysis of computer-crime prosecutions indicates that theft of money and services such as telephone and computer services are the most prevalent criminal acts



SOURCE: NATIONAL CENTER FOR COMPUTER DATA AND RGC ASSOCIATES  
CW CHART: JOHN YORK

and convictions, the NCCCD pointed out. A canvass of 130 prosecutors' offices throughout 38 states in 1986 turned up only 75 cases of computer crimes. "For 1988, we project several thousand arrests," BloomBecker said.

The report noted that in Cali-

fornia, where researchers were able to conduct a complete analysis of computer-crime data, 71% of those arrested for computer crimes were convicted. The remaining cases were split evenly between those dismissed by the court and those dropped by law enforcement officials.

"Those results are similar to what we found in our 1986 survey and not dramatically different than what we project nationally," BloomBecker explained. Laws governing computer crimes are also on the upswing, researchers said. In a 1986 survey, the NCCCD counted 35 states that had passed computer-crime laws. In 1988, researchers found 48 states (Vermont and Virginia are the exceptions) with computer-crime laws.

The computer-crime data in the report is based on a survey of prosecutors' offices in the U.S., data on computer-crime prosecutions in New York, California, Pennsylvania and the federal system and media reports. The

## Career

FROM PAGE 1

technology more closely with the business, he said.

Ask Frank Glover, vice-president of marketing for retail and distribution insulation products at Owens-Corning Fiberglas Corp. in Toledo, Ohio. He is a former vice-president of MIS there. Rich Gonzalez, manager of new business administration at Great West Life Assurance Co. in Englewood, Colo., used to be Great West's manager of microcomputer systems. Cathy Hemmer, senior manager of planning at Metropolitan Fiber Systems, Inc. in Oak Brook Terrace, Ill., was formerly manager of MIS at the Midwest division of MCI Telecommunications Corp.

"Everything we do is getting so dependent on computers that to pretend you don't need an understanding of it doesn't make sense," Gonzalez said.

In most cases, the shift in fo-

a surprise. He said he wanted to gain a better understanding of Noxell's functional areas so that he could better serve those areas as the company's director of MIS. Classes in accounting eventually led to a CPA certificate.

"Much of the activity that I worked on or managed was accounting systems," McCartin

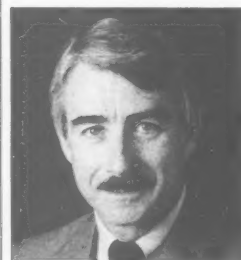


Metropolitan Fiber's Hemmer

said. When a position opened up, "the newly appointed senior VP of finance knew my knowledge of accounting and asked me to become the controller."

It takes management recognition to move up from the IS function. Glover and Gonzalez said they shifted away from IS after being encouraged to do so by management.

Epstein noted that many companies groom future executives by rotating through various departments, including IS. That training can lead to greater future interest in the role systems can play, and managers are likely to retain at least informal ties to that area. For Hemmer and Wier, the ties are more formal:



Owens-Corning's Glover

cus from systems to another area is painless and the risks few, Epstein said. "When you're in MIS, you tend to be analytical about things," Hemmer noted. Moving out of systems "was an easy transition for me because in the planning department, you also have to be analytical," she said.

According to those who formerly worked in the field, IS can also be a good training ground for other skills, including management, planning and communications. Still, those who can effectively make the transition away from IS are typically visionaries, Epstein said.

"I fell in love with the systems and programming area and began to see the opportunities it provides for getting to know a company and how it operates," Wier said. She said she moved beyond IS because she wanted to play an even larger role in the management team. "I was fortunate that at Britannica, I was able to move out of that technical area," she said. She did that by taking on responsibilities beyond IS in 1975 and moving away from it altogether in 1982. Britannica tends to promote from within, said Wier, who subsequently earned an MBA.

For McCartin, the move out of MIS 12 years ago was not quite so calculated; in fact, it was



Noxell's McCartin

The MIS departments of their companies report to them.

McCartin said he is in daily contact with Noxell's MIS workers, and he continues to serve as a member of the Baltimore chapter of the Data Processing Management Association. He taught data processing at Johns Hopkins University for 17 years.

Gonzalez still attends technical conferences and meets with vendors occasionally. When Great West added Sun Microsystems, Inc. workstations running Oracle Corp.'s Oracle relational database management system, Gonzalez took the developer's class "so I would have a good understanding of what the capabilities of our computing platform are."

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1988 by CW Publishing/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: back issues, if available, may be purchased at \$2.00 per issue, plus postage. Call (800) 669-1002.

Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970.

Reprints (minimum 100 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 669-1002.

Requests for missing issues will be honored only if received within 60 days of issue date.

Subscription rates: \$2.00 a copy; U.S. — \$48 a year; Canada — \$110 a year; Central & So. America — \$130 (surface), \$250.00 (airmail) a year; Europe — \$195 a year; all other countries — \$295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

## TRENDS

## Executives and PCs

Nearly 90% of top managers are involved with personal computers at work, but many cannot tell you which package comes from which vendor.

"Opportunities for Marketing PC Software," a survey of more than 450 *Fortune Magazine* subscribers, set out to trace a profile of managers' involvement with and knowledge of PCs and PC software. It found that managers are no strangers to the PC.

Eighty-seven percent of top managers surveyed, compared with an almost equally resounding 81% of the subscribers, said they use PCs, supervise users or play a role in PC hardware and software buying decisions. But when asked to match 34 software products with their respective vendors, only six products were identified correctly by at least half the respondents.

Nonetheless, almost half the executives reported that they are "professional" or "competent" users, and more than 60% said they are often consulted by their colleagues on matters of PCs and PC-related products. Further, executives who use PCs at work are experienced: They spend an average of more than 11 hours per week at their PCs and have been using PCs for an average of almost four years.

In terms of current use and of possible future purchases of machines, IBM was the prevalent brand. Fifty-nine percent of respondents who now use PCs at the office work on IBM equipment, and 60% of those likely to buy machines during the next year were leaning toward IBM. The Personal Computer XT was the most widely used machine — by 20% of respondents — but the Personal System/2 was the most often planned, by 23%.

Apple Computer, Inc. and Compaq Computer Corp. were runners-up, both among machines installed and among potential orders. Apple gathered up 19% of PCs in use and 28% of future picks. The Macintosh SE was at work for 8% of executives and the Mac II for 6%. They traded places, though, in terms of plans: The Mac II, with 15%, led the SE, with 11%.

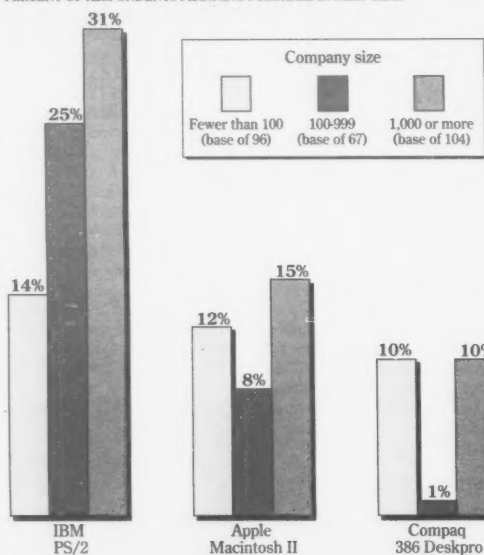
Compaq claimed 13% of PCs installed and 24% of plans. The Portable III 286 and Deskpro 386 tied in the number of installations, but the Deskpro edged out the Portable in plans.

The study suggested that Apple and Compaq are widening their portion of the PC field.

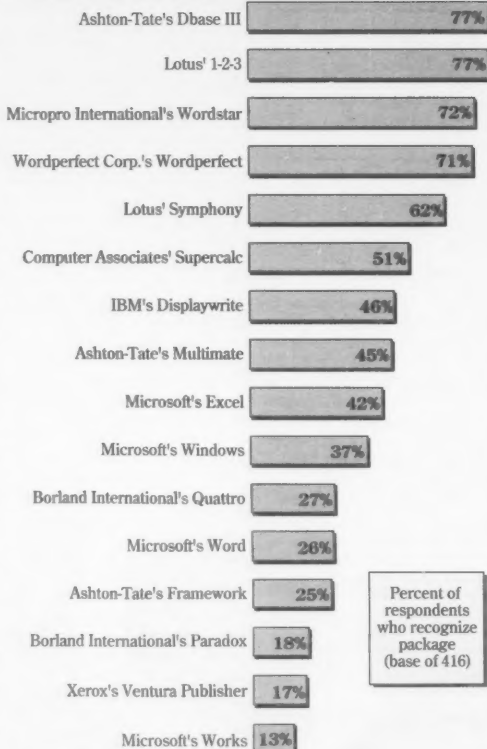
LAURA O'CONNELL

## Company size a big factor in PC buying

PERCENT OF RESPONDENTS PLANNING PURCHASE IN NEXT YEAR



## Many execs don't know who makes what



\*Among those who use PCs or manage PC users  
SOURCE: FORTUNE MAGAZINE MARKET RESEARCH

CW CHARTS: FRANK C. O'CONNELL

## INSIDE LINES

**Service with an electronic smile.** IBM has plans to expand its Service Director tool to printers and other peripheral devices. First on the list is the IBM top-of-the-line laser printer, the 3800; work is under way now, but IBM won't say if it will be ready by year's end. Service Director, an IBM Personal System/2-based performance monitor, was introduced earlier this year as a tool to help users monitor storage devices. The system is linked to an IBM service center for diagnostic tools.

**Custom network showdown.** The Federal Communications Commission will tackle the Tariff 12 issue at a special meeting Tuesday amid rumors that the FCC will reject the controversial AT&T tariff for custom networks and force the firm to resubmit it with modifications. MCI and other rivals have led the protest, arguing that Tariff 12 is too customer-specific and could lead to anticompetitive abuses. No word yet on how this will affect the customers who already have signed onto Tariff 12 — namely, General Electric, Du Pont, Ford, American Express and American Airlines.

**Don't forget to look at the MAP.** Two staffers at GM subsidiary Electronic Data Systems — one in manufacturing and the other in the Plant Automation Group — have allegedly completed a study on the Manufacturing Automation Protocol (MAP) that came up with "differing opinions than GM holds," according to a source. Putting politics aside, our tipster claims the report's authors plan to go ahead and recommend that GM, a leading MAP proponent, not implement MAP in some cases. EDS spokesman Tony Good would only say that EDS conducts many studies for its clients.

**Get out the suntan lotion.** Sun Microsystems is set to launch a new line of workstations based on its Scalable Processor Architecture (Sparc) on April 12. Sun will also introduce a workstation based on Motorola's 68030 microprocessor. The Sparcstation — which has been commonly and probably misleadingly referred to as the "Sparcintosh" — will debut at a press conference at what promises to be a gala event in San Francisco. The entry-level Sparcstation will be priced at less than \$10,000.

**Built for speed, not software.** Intel's new versions of the 80386 and the 80486 microprocessors will not immediately provide users with anything more than speed, according to sources. The 33-MHz 386 will boast an 80-nsec dynamic RAM speed and 20-nsec static RAM speed. The 486, built around the 386 architecture, will be twice as fast as the 386 and top out at 10 million instructions per second, said a source close to Microsoft. It will also provide linear memory addresses and a 487 floating-point calculator. But the 486's new features cannot be fully exploited until a 386 version of OS/2 is released, the source claimed.

**Ironing out the irony.** A side benefit of Novell's agreement to purchase Excelan is the latter's OS/2 LAN Manager license. Novell's Netware and Microsoft's LAN Manager are, of course, rival technologies. "This must be driving Bill [Gates] wild," an observer gloated. But Microsoft claims to be delighted over the prospect of Novell joining the fold. "There's certainly no slashing and burning going on here," said Rob Glaser, Microsoft's director of LAN Business. However, he did note that Microsoft can control the extent to which Novell will benefit from Excelan's license.

**Ringin' bells in Tandem.** An estimated \$1 billion in business for Tandem from AT&T may be brewing for Tandem's unannounced low-end Unix product, expected at mid-year and based on Mips Computer Systems' RISC chip.

**IBM, DEC and Unisys profits — down, down, down. Capital goods spending — down. So why is everyone smiling?** Don't ask us. But you can fill us in on why depressing economic news isn't bad news for the computer industry. Hook up with our bulletin board by setting your modem to 508-626-0165; or, if you prefer to communicate the old-fashioned way, let your fingers do the walking to 800-343-6474 or 508-879-0700 and ask for News Editor Pete Bartollik.

USSRSG10 MAINFRAME 0013: Enter Application

E-Mail

USSRSG2: 070302 E-MAIL COMMAND UNRECOGNIZED

E-MAIL PLEASE!

USSRSG2: 070302 E-MAIL COMMAND UNRECOGNIZED

E-MAIL VERY PLEASE!!

# Why can't mainframes speak English?

You have to wonder why the people who design big computers make it so difficult for normal human beings to use them.

Particularly non-technical, hastily trained human beings, who need to talk to the mainframe from their PCs.

It's been a serious dilemma. Until NOW!

NOW! is a menu-making, macro-writing tool that automates the drudge work of PC-to-host communication.

When someone wants to review their E-Mail, for instance, all they need do is make one menu selection.

NOW! then takes on the tedious job of loading the 3270

NOW!  
PC/HOST AUTOWARE™

**Attachmate**

1-800-426-6283

IN WASHINGTON STATE 206-644-4010.

NOW! and Autoware are trademarks of Attachmate Corp., Bellevue, Wa.  
IBM is a registered trademark of International Business Machines Corporation.

software, logging onto the mainframe, and wading through the passwords and commands to arrive at the E-Mail screen.

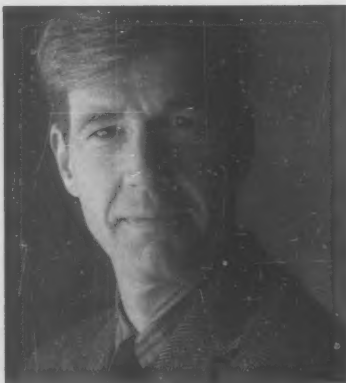
It's not hard to see how NOW! reduces wasted time, needless stress and training costs.

Nor is it difficult to find out more. Simply call or write and we'll send you a free demo disk and detailed information.

All of which, you'll be pleased to hear, is written in a language called English.



# We design software to interface with the most important part of your business.



Without taking anything away from R&D, strategic planning or corporate communications, people are still the heart of every successful business.

A point that often escapes many software vendors, who seem to develop business applications with less regard for the people who use your computer than for the computer itself.

As a result, your staff spends nearly as much time in training as they do working. Backlogs pile up. Your business suffers.

At McCormack & Dodge, our goal has always been to help people work more productively.

That was our intention six years ago when we introduced Millennium,<sup>®</sup> the

first truly integrated processing environment. And it remains so today with business solutions that give you the most flexible user interface yet.


So flexible, in fact, that people can easily tailor applications to their individual needs. For example, a health care user might set up our Human Resource package to monitor their nursing staff schedule, while a manufacturer uses it to track grievances and arbitration results. Whereas our PC Link software lets anyone turn their desktop PC into a personal reporting and modeling tool.

In either case, people continue doing their jobs the best way they know how. With the full backing of M&D's top-rated service and support, of course.

To find out more about customer-controlled software, or any of our Financial, Human Resource or Application Development systems, call McCormack & Dodge at 1-800-343-0325.

We put the customer in control of the software.

**McCormack & Dodge**

 a company of  
The Dun & Bradstreet Corporation



## U·M·I

COMPUTERWORLD FOCUS ON INTEGRATION IS NO LONGER PUBLISHED AS A SUPPLEMENT TO COMPUTERWORLD. BEGINNING WITH THE APRIL 3, 1989 ISSUE IT IS PUBLISHED AS SECTION 2 OF COMPUTERWORLD.



COMPUTERWORLD

SECTION TWO  
OF COMPUTERWORLD  
APRIL 3, 1989

*focus  
on*

# Integration

•Cover story:  
Planning  
for profit

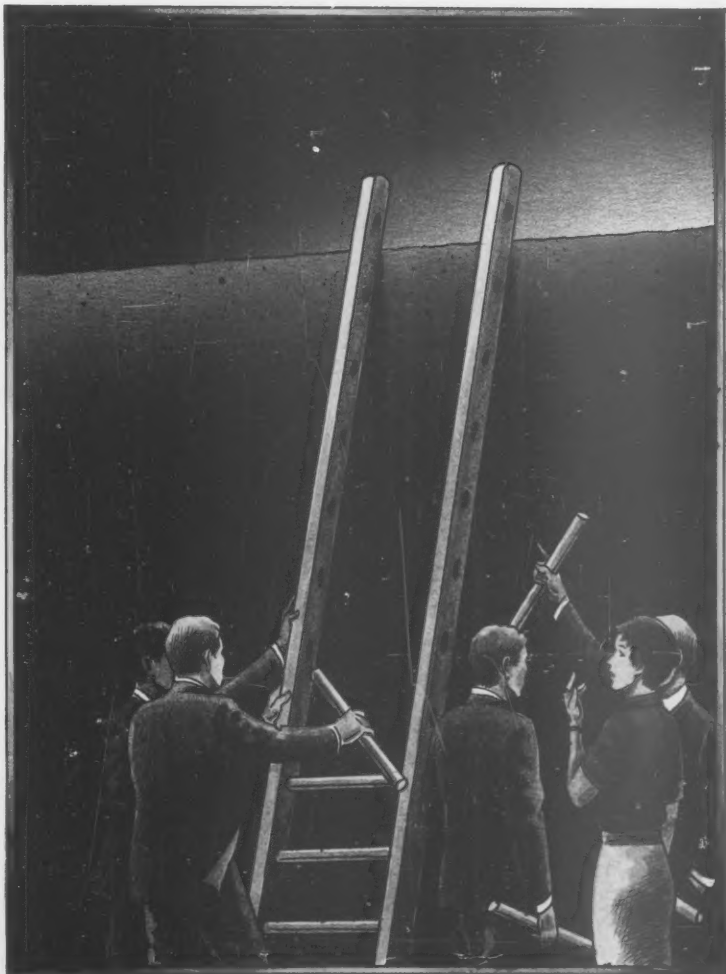
•PC LAN  
control:  
Who has it?

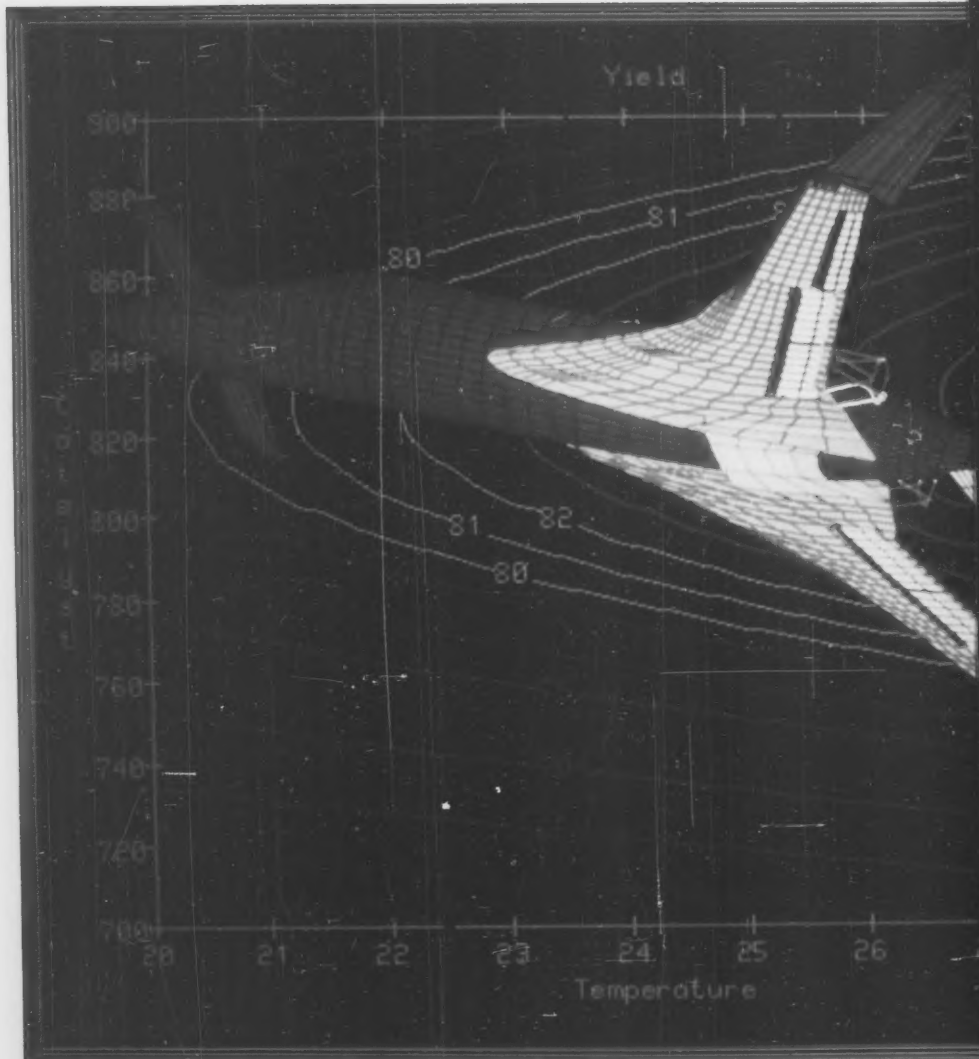
•A question  
of vendor  
bias

•On the  
fast track

•Why  
networks  
fail

•Database  
integration  
success  
stories





© Digital Equipment Corporation 1989. The Digital logo, VAX and Digital are trademarks of Digital Equipment Corporation.

**digital**

**"Digital and BBN  
Software Products  
help manufacturers  
be more competitive  
through computer  
integrated research."**

"To stay competitive, our customers must collect and analyze vast amounts of data in their research laboratories and manufacturing facilities. Digital's distributed, networked desktop computing approach combined with BBN's RS-based family of software products lets scientists, engineers, and manufacturing people share data throughout the company.

"With Digital, we help companies do things now they wouldn't have considered years ago. Now, research and development people can, from their desks, electronically troubleshoot manufacturing problems in plants hundreds of miles away.

"Digital's networking and VAX systems provide individual researchers with the sophisticated tools they couldn't afford if they were working in isolation. By sharing information, researchers can more easily find the answer that's hidden in the data.

"Digital is the clear leader in our prospective markets. Their future direction will maintain that leadership, and we'll be right along with them."

**The rewards of working together.**

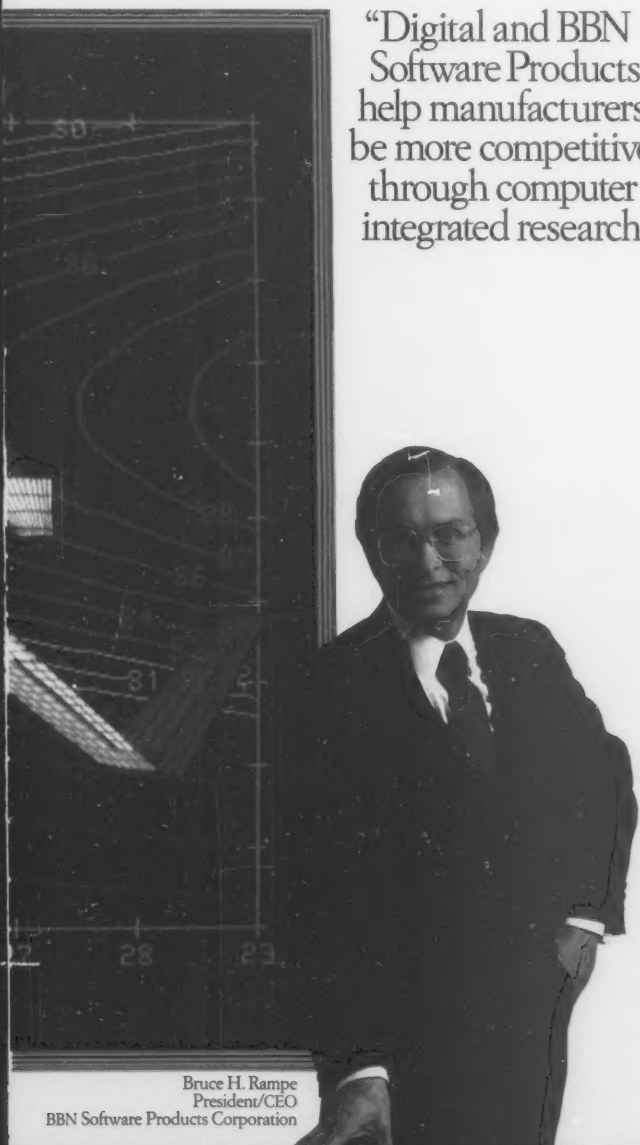
Digital's approach to desktop computing and networking is the most flexible, cost-effective means toward the total integration of your workplace.

Today, with more networks than anyone else, Digital gives you an elegantly simple way for your people to work together more productively, more creatively, more efficiently, more competitively.

To learn more, write to Digital Equipment Corporation, 200 Baker Avenue, Concord, MA 01742-2190. Or call your local Digital sales office.

A way to work together like never before.

**Digital  
has  
it  
now.**



Bruce H. Rampe  
President/CEO  
BBN Software Products Corporation





# INSTANT MAINFRAME. JUST ADD SCO.

Not too long ago, a few dozen people sharing the same programs, resources, and information on a single computer at the same time meant only one thing—a mainframe.

Powerful, big, expensive, and proprietary.

More recently, the same people could be found doing exactly the same things—simultaneously sharing programs, resources, and information—on a minicomputer.

A lot cheaper, a lot smaller, yet powerful enough to do the same jobs. And just as proprietary.

Then along came the latest generation of personal computers. And now, the same people are more and more likely to be found doing exactly the same things—simultaneously sharing programs, resources, and information—on a PC.

And not a whole officeful of PCs networked together, either, but a single PC powering the whole office at once.

A lot cheaper, a lot smaller, yet still easily powerful enough to do the same jobs. Built to non-proprietary, open system standards that allow complete freedom of choice in hardware and software.

And running the industry-choice multiuser, multitasking UNIX® System V platform that gives millions of 286- and 386-based PC users mainframe power every business day.

The UNIX System standard for PCs—SCO.\*

**See us at Comdex/Spring '89,  
Booth #2859**

UNIX is a registered trademark of AT&T. SCO and the SCO logo are trademarks of The Santa Cruz Operation, Inc. Microsoft and DOS are registered trademarks of Microsoft Corporation. OS/2 and Micro Channel are trademarks of International Business Machines Corporation. 1-2-3 is a registered trademark of Lotus Development Corporation. dBASE III PLUS is a registered trademark of Ashton-Tate.

©1989 The Santa Cruz Operation, Inc., 489 Second Street, P.O. Box 7068, Santa Cruz, California 95061 USA.

The Santa Cruz Operation, Ltd., Crawley Court, Station Lane, Watford WD17 0TH, United Kingdom. +44 (0)1915 855454, FAX: +44 (0)1915 857778.

TELEFAX: (0)1915 857778.

Today, SCO UNIX System solutions are installed on more than one in ten of all leading 386 computers in operation worldwide.

Running thousands of off-the-shelf XENIX® and UNIX System-based applications on powerful standard business systems supporting 32 or even more workstations—at an unbelievably low cost per user. And with such blazing performance that individual users believe they have the whole system to themselves.

Running electronic mail across the office—or around the world—in seconds.

Running multiuser PC communications to minis and mainframes through TCP/IP and SNA networks.

And doing some things that no mainframe—or even DOS- or DOS/2™-based PC—ever thought about, such as running multiple DOS applications. Or networking DOS, OS/2, XENIX and UNIX Systems together. Or running UNIX System versions and workalikes of popular DOS applications such as Microsoft® Word, 1-2-3®, and dBASE III PLUS®.

Or even letting users integrate full-featured multiuser productivity packages of their choice under a standard, friendly menu interface.

Today's personal computer isn't just a "PC" anymore, and you can unleash its incredible mainframe-plus power for yourself—today.

Just add SCO.

*The SCO family of UNIX System software solutions is available for all 80286- and 80386-based industry-standard and Micro Channel™ computers.*

**SCO**  
THE SANTA CRUZ OPERATION

**(800) 626-UNIX (626-8649)**  
(408) 425-7222  
FAX: (408) 458-8227

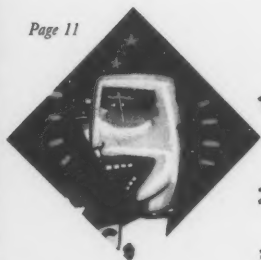
E-MAIL: ...tunnetsco!info info@SCO.COM

Circle Reader Service Number 1

focus  
on  
**Integration**

**i n s i d e**

Page 11



Uncharted  
territory,  
Page 38

**COVER STORY**

**12 THINK PROFIT**

*Integration planning can improve your company's economic outlook.* By Helen Pike

**FEATURES**

**26 PC LAN CONTROL**

*Find out who has it and who doesn't.* By Mark Breitbart

**30 ON THE FAST TRACK**

*The accomplishments of Union Pacific's IS staff.* By Helen Pike

**36 THE BIG PAYOFF IN EXPERT SYSTEMS**

*Expert systems aren't stand-alone anymore.* By David Freedman

**46 A QUESTION OF BIAS**

*Are systems integrators playing fair?* By Stan Kolodziej

**50 WHY NETWORKS FAIL**

*Protect your network investment from the forces out to ruin it.* By Avery Jenkins

**54 CASEING THE JOINT**

*Preparation can make the CASE transition a smooth one.* By Stan Kolodziej

**62 FIT TO BE TIED**

*No one said integrating databases was going to be easy.* By Mark Breitbart

**9 ISSUES & TRENDS**

WANTED: INTEGRATION SPECIALISTS

DATABASES IN THE '90S

THE YES/MVS FIASCO

HDTV IN BUSINESS

ON THE CONTRARY

*Opinions on the interstate network tax.*

**LOG ON**

*A few words from our editor.*  
Page 7.

**LETTERS**

*Reader feedback.*  
Page 8.

**LOG OFF**

*Next wave and On the road columns.*  
Page 80.

**71 MANAGING**

MARKETWISE

*Organizational networking.*

CORNER OFFICE

*Cross-functional systems.*

ACHIEVERS

*The Dormitory Authority of New York's atypical CIO.*

CROSS SECTION

*Your peers reveal the obstacles to their integration plans.*

CLIPS

*The latest thinking from the leading management, business and science journals.*

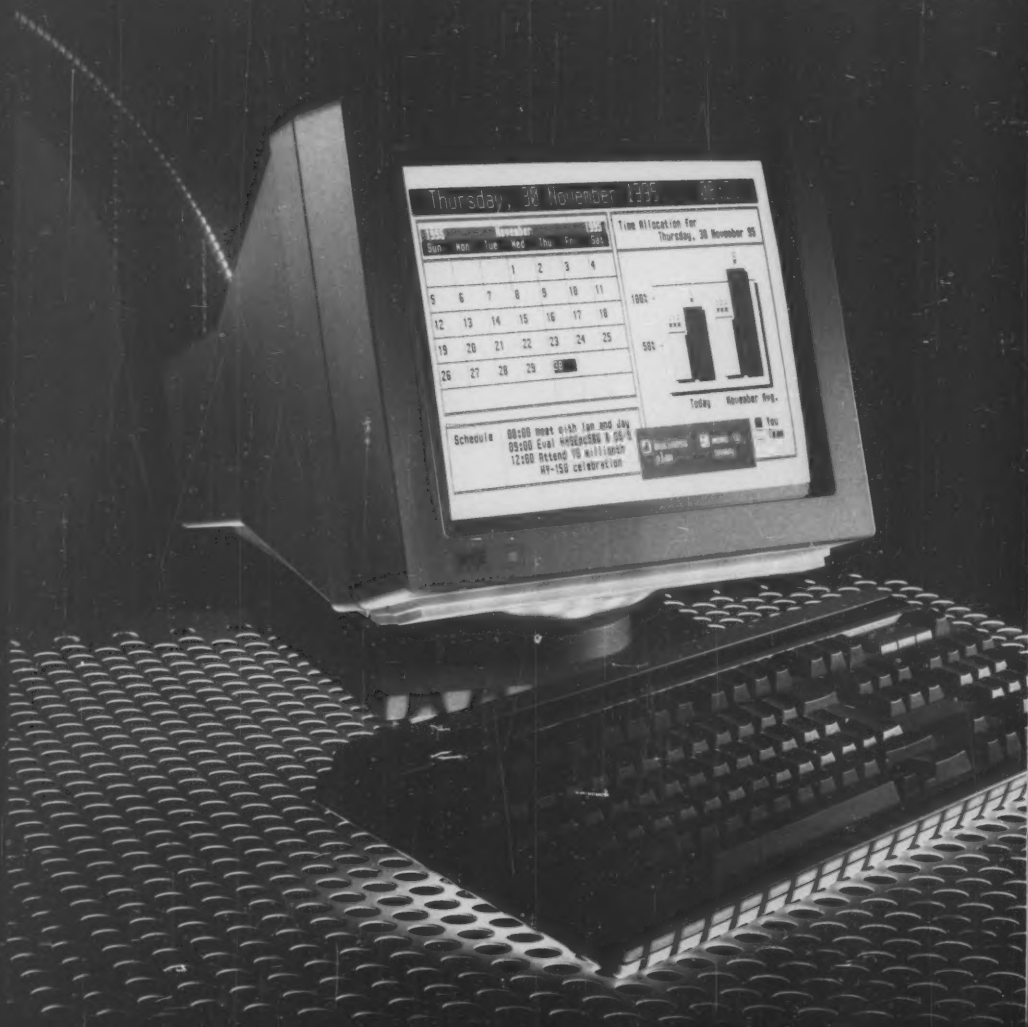
Cover Illustration: Jean-Francois Allaux

Computerworld Focus on Integration 3

Forging an  
integrated  
database,  
Page 62



# The Terminal O Arrived A



# f The '90s Has Bit Early.

Wyse introduces the WY-150. They always said there would be such a terminal "someday". It would have the flexibility and connectivity to operate in virtually any computing environment, while meeting the most exacting ergonomic requirements. And, it would deliver those advantages at an affordable price.

"Someday" is here much sooner than expected. It's called the Wyse WY-150, a breakthrough in terminal technology that will set price/performance standards for years to come.

Bridging the worlds of ASCII, ANSI and PCs, the new WY-150 offers compatibility with a wide range of operating systems. Including UNIX/XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK. With a choice of three keyboards.



Choose  
your favorite  
WY-150 options.

And typical of Wyse, the WY-150 does it all with stylish design, at a price that's also attractive.

The WY-150 also sets new ergonomic standards. Its 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out vividly.

The WY-150 is also part of *SystemWyse*. It links effortlessly with Wyse PCs and multi-user platforms to create uniquely integrated and cost-effective solutions. Everything is designed, manufactured, and tested by Wyse to work together. And it's all backed by the service and support of the world's leading independent terminal maker.\*

Only one question remains. Now that the terminal of the '90s is here, what are you waiting for? Call for more information.

**1800-GET-WYSE**

(1-800-438-9973)

Wyse\* is a registered trademark of Wyse Technology. SystemWyse and WY-150 are trademarks of Wyse Technology. Other trademarks/owners: UNIX/American Telephone & Telegraph, Concurrent DOS/Digital Research Inc., PC MOS/The Software Link, Inc., PICK/Pick Systems; MS-DOS, XENIX/Microsoft. \*IDC 1988 U.S. Terminal Census.

## WYSE

We make it better, or we just don't make it.

Circle Reader Service Number 2



# WE'VE JUST ELIMINATED THE ONE MAN WHO'S STOOD BETWEEN YOU AND THE WORLD'S MOST POWERFUL EIS.



## Introducing the EIS/Generation Series from Pilot: Full EIS capability without the big support bills.

Announcing EIS/G, the industry's first series of EIS code generators. This new technology can reduce your EIS development and support costs by up to 80%. And you won't need a programming staff to implement powerful EIS systems. Pilot's experience with leading corporations will also ensure that your executives will have proven and effective EIS functionality. Code generation means you can have it at a fraction of the overall cost.

Put EIS/G to the test. Call us at (617) 350-7035 to arrange a one hour demonstration at your office. We'll show you EIS in a different shade of green.

**PILOT**

EXECUTIVE SOFTWARE  
40 Broad Street Boston, MA 02109

l o g o n

• • • • •

## Reader response is music to our ears

**O**ur first issue of *Computerworld Focus on Integration* seems to have struck a chord, if reader response is any indication. The feedback has been tremendous for the magazine and the integration topics and technologies it covers.

What we have concluded from this reaction is that even though there is a lot of

integration activity on everyone's part, there is still a lot of confusion. What are vendors *really* offering? Should you go with a systems integrator or struggle on alone? Is integration possible with today's technology?

None of these are easy questions to answer, nor, unfortunately, is the process of integrating your technologies and organizations easy. But then again, when has it been effortless to reach a goal with such a great potential for reward?

Our objective is to help you find some answers in our publication.

Take our cover story — How many of you have strategic, long-term plans in place to help you move toward integration? Senior writer Helen Pike talked to a number of IS executives who have gone through the complex planning process. She found out how they put their integration plans in

place and why they feel strategic planning has given them a jump on their competition. She also discovered that their integration strategies are irrevocably entwined with today's changing business climate.

Writer Mark Breibart provides some surprising findings in his story on "PC LAN control: Who has it, who doesn't." Read what he has to say about the evolving relationship between IS and end users when it comes to networking.

And while you're at it, read Stan Kolodziej's story on whether you can trust vendors to deliver the best integration solution without product bias.

Let me know your response to these and other stories in this issue. We want to hear your war stories, your ideas and your thoughts on both integration technology and on our *Integration* magazine. Write me, Ann Dooley, Editor, *Computerworld Focus on Integration*, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701. Or call me at 1-800-343-6474 or our bulletin board at 508-626-0165.

*Ann Dooley*



KEVIN POPE

Our  
objective  
is to  
help you  
find  
some  
answers.

### Editorial Director/Editor

ANN DOOLEY

### Managing Editor

LORY ZOTTOLA

### Senior Editor

STAN KOLODZIEJ

### Senior Writer

HELEN PIKE

### Interns

MARK BREIBART

### Art Director

TOM MONAHAN

### Design Consultant

RONN CAMPISI

### Computerworld Chief Copy Editor

MARY GROVER

### Assistant Editor

JULIE L. COOK

### Copy Editors

COMPUTERWORLD COPYDESK

### Editorial Assistant

MEGAN SANTOSUS

### Contributing Writers

DAVID FREEDMAN

AVERY JENKINS

SARAH B. KAULL

### Senior Advertising Coordinator

SUSAN THAXTER

### Production Director

LEIGH HOMETH

### Assistant Production Director

CAROL POLACK

### Production Manager

CHRISTOPHER P. CUOCO

### Computerworld Editor in Chief

BILL LABERIS

### Computerworld Executive Editor

PAUL GILLIN

CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1989 by CW Publishing/Inc. All rights reserved. *Computerworld* can be purchased on 35mm microfilm through University Microfilm Inc. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, MI 48106. *Computerworld* is indexed; may be purchased from the *Computerworld* Back Issue Department. Back issues, if available, may be purchased at \$2.00 per issue, plus postage. Call M. McIndoo, (800) 343-6474, Ext. 371. Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 100 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171. Subscriptions call toll free (800) 669-1002. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: \$2.00 a copy U.S. — \$48 a year; Canada, Central & So. America — \$110 a year; Europe — \$165 a year; all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

## letters

### Replacing the sacred order

Congratulations! Finally, a publication that is starting to focus on achieving objectives and solving business problems rather than just focusing on plain old technology.

After managing an IBM Briefing Center and consulting and listening to top executives for the past 12 years, I have heard them say what they want, and I have seen what they get. It has been a rude shock.

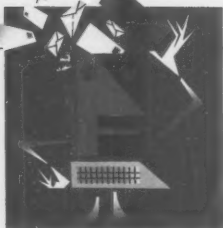
People are only now starting to appreciate what technology's real impact will be on how we live and work. The key is that information is no longer in the hands of the technical priesthood. (When only priests spoke Latin and Cobol, they controlled.)

However, the priests are not giving up easily. In the rapidly changing business world, with its mergers and spinoffs, as pointed out in Helen Pike's article "Oh, no! We've been sold" [*Integration*, Feb. 6], top management can no longer afford to wait 10 years and spend \$10 million to convert or integrate dissimilar technologies.

Conversion and technical integration are expensive relics, cloaked in technical terms that are not in the vocabulary of today's executives.

We still have a long way to go, but the means to get there is now at hand. There is no need to throw away existing technologies that work to implement new strategic applications and integration. Let the old technologies "rust out" gracefully and nondisruptively while we take advantage of new tools to achieve our business objectives.

Nondisruptive should become the key work in all systems integration efforts. This will not be welcome news to vendors and technologists who thrive on the latest and the greatest and who prefer words like "international standards," "bridges," "gateways" and so on. These elements are all worthwhile, but they are either not here yet, take time, are costly, require disruption or do not solve business problems today.



### STAY IN TOUCH!

IF YOU HAVE ANY COMMENTS ABOUT OUR COVERAGE, PLEASE CONTACT US. ADDRESS YOUR LETTERS TO: THE EDITOR, *COMPUTERWORLD FOCUS ON INTEGRATION*, 375 COCHITUATE ROAD, FRAMINGHAM, MASS. 01701. OR REACH US THROUGH OUR BULLETIN BOARD NUMBER — 508-626-0165.

The old priests have served us well, but as your articles continually point out, it is time for a change in perspective.

The pace of change is blinding but exciting, and new thinking is required to survive and thrive.

Integration should take on a new meaning and vocabulary that reflect business objectives vs. technical terms. It's what you want to do that is important, not how you do it.

I would hope to see more articles along this line so more people can start to realize the potential that can be ours.

JAMES G. SPENCER  
BUSINESS INFORMATION CONSULTANT  
BOCA RATON, FLA.

### Keep it up

Keep up the great work and nice look of *Focus on Integration* and be sure to continue to fill us in on what's happening with the Apple story. Mark Breitbart's clip, "Fill our cups, Apple," was great. While I am not yet an IS heavyweight, I do enjoy your coverage.

ERNEST LEHMANN  
APPLICATION SUPPORT ANALYST  
KELLY SERVICES  
ROCHESTER, N.Y.

### X marks the spot

I would like to see your magazine focus on X Windows and X terminals because these seem to be coming areas that warrant some press. Love the *Focus on Integration* issues; keep them rolling.

MICHAEL HIGGINS  
TECHNICAL SUPPORT MANAGER  
BYER CALIFORNIA  
SAN FRANCISCO

### Checklist for integration

I would like to see in *Integration* a checklist of the items and/or concerns that should be addressed when creating an integrated system. The information already exists in the text of many articles, but it would be nice to have a "check off" list or sheet for reference — possible two or three depending on whether a mainframe, all PCs or some other combination were involved.

VITO CARAVITO  
CHIEF ENGINEER  
GOODYEAR TIRE & RUBBER CO.  
AKRON, OHIO

### VAX workstation dilemma

We currently run an IBM System/38 and Digital Equipment Corp. VAX 8530 shop. Both machines are interfaced to each other. The problem is we would like the VAX 8530 to act as a workstation and emulate the System/38. Any suggestions from your readers on how I might go about this?

RAJ MUTHUSAMY  
INTERNATIONAL SYSTEMS OPERATIONS  
BANK OF CALIFORNIA  
NEW YORK

### A service to the services industry

Congratulations! *Computerworld Focus on Integration* is an excellent magazine and a welcome new source of information. I wish you the best of luck as you work to continue the high level of quality you and your staff have achieved in the premier issue.

EDWARD LOSS  
DIRECTOR OF MARKET DEVELOPMENT  
CAP GEMINI AMERICA  
NEW YORK



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

**Computerworld Focus on Integration**

Post Office Box 5112  
Pittsfield, MA 01203-9930



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



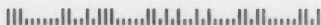
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

**Computerworld Focus on Integration**

Post Office Box 5112  
Pittsfield, MA 01203-9930





COMPUTERWORLD

focus  
on

## Integration

## Reader Service Card

Date: April 3/Expires: June 16, 1989

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_ Phone \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## A. Please check the business/industry in which you work: (check one)

## End Users

- 1 ☐ Manufacturer (other than computer)  
 2 ☐ Finance/Insurance/Real Estate  
 3 ☐ Medicine/Law/Education  
 4 ☐ Wholesale/Retail Trade  
 5 ☐ Business Service (except DP)  
 6 ☐ Government - State/Federal/Local  
 7 ☐ Public Utility/Communication Systems/Transportation  
 8 ☐ Mining/Construction/Petroleum/Refining  
 9 ☐ Other User \_\_\_\_\_ (please specify)

## Vendors

- 10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals  
 11 ☐ Computer Service Bureau/Software/Planning/Consulting  
 12 ☐ Computer/Peripheral Dealer/Distributor/Retailer  
 13 ☐ Other Vendor \_\_\_\_\_ (please specify)

## B. Please check your main job function: (check one)

- 1 ☐ Corporate Management  
 2 ☐ Financial Management  
 3 ☐ MIS/DP Management  
 4 ☐ MIS/DP Operations  
 5 ☐ Data Communications Management  
 6 ☐ Data Communications Operations

## C. Reason for this inquiry: (check one)

- 1 ☐ Immediate purchase  
 2 ☐ Future purchase  
 3 ☐ Information only

## D. Is this your personal copy of Computerworld Focus on Integration?

- 1 ☐ My personal copy  
 2 ☐ I'm a pass-along reader

## E. Please check the number of employees in your company: (check one)

- 1 ☐ Over 1,000 employees  
 2 ☐ 501-1,000 employees  
 3 ☐ 500 or under

Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1 21 41 61 81	101 121 141 161 181
2 22 42 62 82	102 122 142 162 182
3 23 43 63 83	103 123 143 163 183
4 24 44 64 84	104 124 144 164 184
5 25 45 65 85	105 125 145 165 185
6 26 46 66 86	106 126 146 166 186
7 27 47 67 87	107 127 147 167 187
8 28 48 68 88	108 128 148 168 188
9 29 49 69 89	109 129 149 169 189
10 30 50 70 90	110 130 150 170 190
11 31 51 71 91	111 131 151 171 191
12 32 52 72 92	112 132 152 172 192
13 33 53 73 93	113 133 153 173 193
14 34 54 74 94	114 134 154 174 194
15 35 55 75 95	115 135 155 175 195
16 36 56 76 96	116 136 156 176 196
17 37 57 77 97	117 137 157 177 197
18 38 58 78 98	118 138 158 178 198
19 39 59 79 99	119 139 159 179 199
20 40 60 80 100	120 140 160 180 200

Please  
Use  
This  
Card  
For  
Product  
Information



COMPUTERWORLD

focus  
on

## Integration

## Reader Service Card

Date: April 3/Expires: June 16, 1989

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_ Phone \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## A. Please check the business/industry in which you work: (check one)

## End Users

- 1 ☐ Manufacturer (other than computer)  
 2 ☐ Finance/Insurance/Real Estate  
 3 ☐ Medicine/Law/Education  
 4 ☐ Wholesale/Retail Trade  
 5 ☐ Business Service (except DP)  
 6 ☐ Government - State/Federal/Local  
 7 ☐ Public Utility/Communication Systems/Transportation  
 8 ☐ Mining/Construction/Petroleum/Refining  
 9 ☐ Other User \_\_\_\_\_ (please specify)

## Vendors

- 10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals  
 11 ☐ Computer Service Bureau/Software/Planning/Consulting  
 12 ☐ Computer/Peripheral Dealer/Distributor/Retailer  
 13 ☐ Other Vendor \_\_\_\_\_ (please specify)

## B. Please check your main job function: (check one)

- 1 ☐ Corporate Management  
 2 ☐ Financial Management  
 3 ☐ MIS/DP Management  
 4 ☐ MIS/DP Operations  
 5 ☐ Data Communications Management  
 6 ☐ Data Communications Operations

## C. Reason for this inquiry: (check one)

- 1 ☐ Immediate purchase  
 2 ☐ Future purchase  
 3 ☐ Information only

## D. Is this your personal copy of Computerworld Focus on Integration?

- 1 ☐ My personal copy  
 2 ☐ I'm a pass-along reader

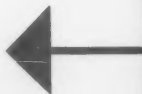
## E. Please check the number of employees in your company: (check one)

- 1 ☐ Over 1,000 employees  
 2 ☐ 501-1,000 employees  
 3 ☐ 500 or under

Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1 21 41 61 81	101 121 141 161 181
2 22 42 62 82	102 122 142 162 182
3 23 43 63 83	103 123 143 163 183
4 24 44 64 84	104 124 144 164 184
5 25 45 65 85	105 125 145 165 185
6 26 46 66 86	106 126 146 166 186
7 27 47 67 87	107 127 147 167 187
8 28 48 68 88	108 128 148 168 188
9 29 49 69 89	109 129 149 169 189
10 30 50 70 90	110 130 150 170 190
11 31 51 71 91	111 131 151 171 191
12 32 52 72 92	112 132 152 172 192
13 33 53 73 93	113 133 153 173 193
14 34 54 74 94	114 134 154 174 194
15 35 55 75 95	115 135 155 175 195
16 36 56 76 96	116 136 156 176 196
17 37 57 77 97	117 137 157 177 197
18 38 58 78 98	118 138 158 178 198
19 39 59 79 99	119 139 159 179 199
20 40 60 80 100	120 140 160 180 200

Please  
Use  
This  
Card  
For  
Product  
Information



I have circled #200 on the Reader Service Card to enter my Computerworld subscription for one year, 51 weekly issues and special bonus sections of Computerworld Focus on Integration for \$48 and please bill me later. This rate valid only in the U.S.

## TOO MANY JOBS, TOO FEW SPECIALISTS

Carl Kelly isn't running a training center for systems integration specialists. But you'd think he was with all the calls he gets from headhunters seeking people with integration skills.

Kelly, vice-president and general manager of the systems integration division at Planning Research Corp., an information services organization in McLean, Va., says the calls are a result of what is happening in the market. Systems integration is seen as critical for businesses, but because this is a recent phenomenon, the number of high-level executives with integration skills is limited.

The need for such executives is not confined only to systems integration and high-tech firms, according to Herb Halbrecht, president of Halbrecht Associates, Inc., an executive search firm in Stamford, Conn. In an era of heavy decentralization, many organizations, especially in the banking and financial fields, are turning the IS function into a strategic business unit whose main thrust is to integrate technology to gain a competitive edge.

What kind of personnel are

companies looking for? Halbrecht says executives with 15 or more years of integration expertise and business experience are highly prized. And highly paid. Both Kelly and Halbrecht put salaries at between \$90,000 to \$150,000 a year.

For companies that have such sought-after employees, keeping them satisfied is crucial. Halbrecht says the very enticements recruiters use to land executives for their clients are the ones companies should use to retain their best people. It takes a combination of compensation, challenge and benefits — as well as a clearly defined growth path.



• Demand for integration specialists keeps Kelly on the phone.

Kelly's solution is to maintain a surplus of technically adept and business-savvy staff by "forward hiring," that is, hiring in anticipation of a need.

And well he should. For the near term, the market for integration specialists is going to remain tight, says Bill Young, president of search firm Bill Young Associates, Inc. in Fairfax, Va. — BY LORY ZOTTOLA

## FIVE YEARS IN THE LIVES OF DATABASES

Year	IBM's Activities	Database Vendors' Activities	Users' Activities
1990	Introduces central system repository to integrate databases and CASE.	Workstation software vendors begin major shift toward object-oriented architectures.	Users begin to perceive how distributed databases can aid integration.
1991	Extends remote SQL requests to multiple mixed databases.	Adaption of products to IBM's central system repository and object-oriented systems.	Main concerns are with integration of database with other software.
1992	Announces first object-oriented facilities for relational databases.	Natural language interfaces become more common.	Leading-edge users use object-oriented systems for commercial applications.
1993	Completes heterogeneous distributed database environment that joins across mixed systems.	Major shift of emphasis to object-oriented systems.	Mainframe shipments start to decline as distributed systems and databases take over more applications.
1994	Enhances performance of distributed databases. Major extensions to object-oriented facilities. Software revenues reach levels comparable with declining mainframe revenues.	Major shakeout of suppliers as IBM tries to dominate software industry.	Vendor competition and available technologies such as object-oriented systems extend range of computer applications to new areas on a large scale.

### NOTED

YOU CAN REACH INTEGRATION STAFF ON-LINE THROUGH OUR BULLETIN BOARD. CALL US AT 508-626-0165 WITH LETTERS TO THE EDITOR, SUGGESTIONS OR PROBLEMS. THE BULLETIN BOARD SUPPORTS 300, 1,200 AND 2,400 BIT/SEC. TRANSMISSION.

INFORMATION PROVIDED BY OVUM LTD., LONDON

# She just discovered the difference in using IBM and DEC. None.



Talk about ease of use, the Interlink Computer Sciences SNS/SNA Gateway™ Family of connectivity solutions is so transparent that IBM users tell us they literally forget they're accessing DEC nodes.

In fact, whether you're on the IBM or DEC side, the environment is completely friendly and familiar.

IBM and DEC users can push and pull information at high speed in either direction using their native commands and menus. You can read either system's directory, submit jobs, create or download a printout.

You can use the fastest printers, peripherals and data processing across your Interlink joined IBM/DEC network. All without additional instruction.

## **Build a seamless IBM/DEC network**

Now, your DEC-based applications can communicate directly with APPC/LU6.2-based applications via your IBM SNA network.

With Interlink's NetView interface, the entire IBM/DEC network can be controlled using NetView network management tools and commands from a single operator console.

The Interlink gateway family is the first with a live, full screen terminal emulation product that can make 3270 terminals look like VT terminals, and vice versa.

Also included in the gateway is a data dictionary facility. To activate it, you simply take a few minutes to define the parameters of a typical record; the Interlink software will then automatically translate all similar records.

All this opens up enormous possibilities. For example, a financial institution with offices in New York, Chicago and Los Angeles can seamlessly tie together their

***Imagine! You can  
access the mainframe without  
opening a manual!***

three DECnet networks over SNA to speed electronic funds transfer.

The gateway also supports standard security interfaces—RACF, ACF2, TOP SECRET, VM/SECURE—as well as user-created security packages.

Our clients already include nearly half of the Fortune 100 corporations who view our solutions as a strategic part of their business.

## **Free demo disk**

To get a taste of what true IBM/DEC transparency is really like, write or call for a free IBM PC-compatible demo disk. (800) 422-3711. Interlink Computer Sciences, Inc., 47370 Fremont Boulevard, Fremont, CA 94538.



Trademarks: SNS/SNA Gateway is a trademark of Interlink Computer Sciences, Inc. IBM is a registered trademark of International Business Machines Corp. NetView, RACF, MVS, VM, and MVS/ESA are trademarks of International Business Machines Corp. DEC, DECnet and VAX are trademarks of Digital Equipment Corp. ACF2 is a trademark of UCCEL Corporation. VM/SECURE is a trademark of VM Software, Inc. TOP SECRET is a trademark of Computer Associates International, Inc.

■ IBM STRATEGIES

## VENDORS SEIZE OPPORTUNITY IN MARKET IBM OVERLOOKS

A few years ago, IBM gave an artificial intelligence party for MVS. They called it YES/MVS. Attendees at YES/MVS were given a mission: Develop expert systems that could be used for increasing the performance of IBM's MVS, software that was (and still is) notorious for eating data resources.

MVS performance had increasingly come under pressure as the operating system began to handle the load of networked systems.

Nothing much came of that YES/MVS project.

Ironically, an IBM expert system called KnowledgeTool, developed outside the scope of YES/MVS, has quietly become

one of the most widely used expert system tools within the MVS performance monitoring business — widely used by vendors other than IBM, that is.

IBM admits that it is not actively selling KnowledgeTool. The company has pretty much left the fast-growing performance monitoring business to the likes of Candle Corp. and Boole & Babbage, Inc.

Meanwhile, firms such as MVS Software, Inc. have been supplying performance monitoring links to KnowledgeTool and other expert systems, enabling users to customize how a system will respond to problems during MVS operations.

"Expert systems like KnowledgeTool give operators



*MVS' appetite slows its performance.*

more flexibility to reconfigure the order of computer system jobs," explains Earl Hodil, director of technical support at MVS Software. "I don't know why IBM doesn't promote it more." — By STAN KOLODZIEJ



# The best route between your Novell LAN and a mainframe is just ahead.



## FIBER FINDS FAVOR

According to KMI estimates, by 1992, the use of fiber optics will more than triple.

There's good news for communications managers who want to use fiber but are frightened by the cost. Fiber cabling has been unpopular because it's more expensive than copper wiring, but as its use spreads, prices are expected to fall.

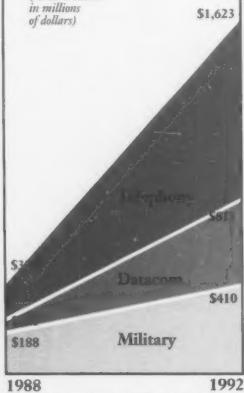
By 1992, the use of fiber optics will have more than tripled, reports Kessler Marketing Intelligence Corp. (KMI) in Newport, R.I. More than half of that increase in usage will come from telephone companies.

The divested Bell operating companies are by far the largest consumers of fiber, says analyst Judith Flynn at KMI. In the next few years, they will continue to upgrade and expand the feeder portion of the public phone lines — the piece con-

### Rich in Fiber

Fiber optics will experience spectacular growth in three areas

(Growth shown in millions of dollars)



SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.

necting the central offices to distribution points.

For data communications, a major impetus will be the growth of local-area networks. One of fiber's advantages over twisted-pair cabling is that it can maintain high data transmission speeds over longer distances, which becomes important as LANs extend throughout large corporate complexes.

Even for shorter distances, LANs will increasingly be tying together graphics applications, computer-aided design and manufacturing programs and engineering workstations, all of which can benefit from fiber's faster transmission speeds.

The Fiber Distributed Data Interface (FDDI) standard should give the use of fiber another boost when it arrives in the next year or two. Such standardization promises a stable market of products that can take

*continued on next page*

## RabbitGATE. A faster, more reliable

If you need a fast, reliable, efficient way to connect your Novell LAN to an IBM mainframe, the signs all point to RabbitGATE.™ No other gateway offers Novell LAN users more performance and flexibility.

© 1988 Windows Software Corp.

RabbitGATE's comprehensive IPX/SPX support enhances Novell LANs and gives each workstation about 20kb of memory by eliminating the need to load NetBIOS. IPX/SPX also provides faster, more efficient network routing. And it enables

inter-LAN gateway access—for SNA, BSC, DFT, and X.25 networks.

And RabbitGATE support doesn't end with Novell LANs. It works as well with NetBIOS LANs. And like all Rabbit products, it provides a growth path con-

*continued from previous page*  
advantage of FDDI's 100M-bit speed.

Finally, computer makers are exploiting fiber's speed and high bandwidth for connecting CPUs to peripherals and even for tying processors to each other.

Much of the increase in the datacom use of fiber also comes from the growth of fiber-based private-line networks. These lines are used by telecom managers who hope to save money by bypassing the public phone system. — BY MARK BREIBART

#### NOTED

ACCORDING TO THE SOFTWARE PUBLISHER'S ASSOCIATION, SALES OF INTEGRATED PC SOFTWARE ROSE FROM \$128.1 MILLION IN 1987 TO \$182.6 MILLION IN 1988, A GROWTH RATE OF 42.6%.

#### ■ IN THE COURTS

### FCC ADOPTS AT&T PRICE LIMIT PROPOSAL

The Federal Communications Commission has ruled in favor of what is considered potentially the biggest issue for data and telecom users since the breakup of AT&T.

The FCC has adopted AT&T's price limit proposal, which enables the carrier to escape from an FCC ruling that arose from the company's divestiture. Previous legislation put a cap on the amount of profit AT&T could make on long-distance communications services. The new legislation, however, places price limits on the carrier's long-distance rates instead.

In effect, AT&T will not be able to raise or lower communications rates for business users

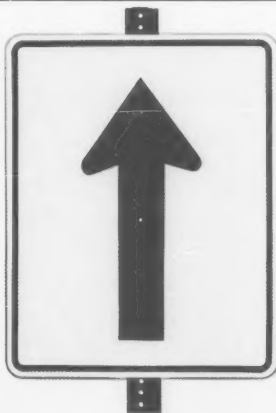
more than 5% each year.

This scheme will likely increase the company's profit margins if coupled with lower operating costs and upgraded telecom equipment, AT&T says.

According to August Blegen, executive director of the Association of Data Communications Users and veteran of the telecom regulatory scene in Washington, D.C., an increase in AT&T profit margins might be passed along to communications users in the form of lower prices, which has happened in the past.

Others are not so sure. The International Communications Association and the Consumer Federation of America, both representing numerous U.S. private and government telecom users, remain wary, saying it will be some time before the extent of savings to users becomes clear. — BY STAN KOLODZIEJ

*An increase  
in AT&T  
profit mar-  
gins might  
be passed  
along to us-  
ers in the  
form of low-  
er prices.*



## gateway optimized for Novell's IPX.

sistent with IBM's System Application Architecture. Add to these advantages Rabbit's reputation for reliability and technical support and you've got a very convincing case for RabbitGATE.

For information that can put you on

the road to flexible, high performance connectivity between Novell LANs and IBM mainframes, write Rabbit Software Corporation, 7 Great Valley Parkway, Malvern, PA 19355. Or take a faster route. Call 1-800-RabbitC.

**Rabbit**  
SOFTWARE  
*We've got them all talking™*  
Circle Reader Service Number 5

## ■ ON THE CONTRARY

INTERSTATE NETWORK TRAFFIC TAX  
HARMS THE TELECOM INDUSTRY

**AT ISSUE:** A Supreme Court ruling handed down in January allows states to tax interstate voice and data traffic. The decision in the *Goldberg v. Sweet* trial upheld an Illinois law imposing a 5% excise tax on interstate voice and data transmissions that begin or end in the state. The following debate underscores the controversy that has arisen from the ruling.

**PRO:**  
**KENNETH L. PHILLIPS**

The recent U.S. Supreme Court decision asserting the lawfulness of states imposing a tax on interstate telecommunications is neither a mandate to do so nor a sound policy directive for state governments to follow.

Telecommunications is no longer simply one of the many monthly overhead items constituting the cost of doing business. Rather, as growth in the economy moves increasingly into the service sector, telecommunications becomes a strategic asset as well as the cornerstone of the product-differentiation process.

To the extent that telecommunications is taxed, disincentives are being applied to both the highest growth sector in the economy and, perhaps, to the area with the greatest decided advantage over offshore competition.

Members of the Committee of Corporate Telecommunications Users report that increasingly, telecommunications considerations are determining site location decisions for back-office and large data processing facilities.

As a result, the Supreme Court has tacitly created an opportunity for states that choose not to create such new taxes. These states may become especially desirable as locations for telecommunications-intensive

functions, especially with distance-sensitive costs declining quickly.

States that have densely populated urban centers stand to lose more in sales tax and personal income tax than they would otherwise gain in a 5% or 6% tax on interstate telephone calls.

Taxing telecommunications is a tax on the future, and while this action may be legal, it is hardly logical or even productive of significant net revenue to the states.

•Phillips (top) is chairman of legislative affairs for the Committee of Corporate Telecommunications Users.

•Flug (bottom) is a partner in the Washington, D.C., law firm of Lobel, Novins, Lamont & Flug, attorneys for the State and Local Legal Center in the *Goldberg v. Sweet* case.

**CON:****JAMES FLUG**

The U.S. Supreme Court has made clear that interstate businesses, such as telecommunications companies, must bear their fair share of the expenses of the state government in which they operate. States can levy taxes — income, excise, sales, gross receipts — that are tailored to each business' level of activity connected with the state. If one activity escapes a state tax, then the tax burden will be unfairly shifted to all other activities.

Even GTE Sprint Communications Corp., in *Goldberg v. Sweet*, admitted that telephone activity is taxable. But it argued that instead of one state taxing an entire interstate call, the tax should be apportioned among all states involved in the call. This solution would not work.

As the states pointed out, the realities of modern telecommunications make such a proposal totally impractical for interstate carrier and customer alike: Identical calls may travel hundreds of thousands of different paths and a single call may switch routes in midstream many times to reflect traffic and technical conditions.

The telephone industry is much better off with the simple and straightforward system upheld in the *Goldberg* case — either the state of origination or termination should tax a call, depending on which end is paying for it. The possibility that the definitions of "paying" might overlap should cause no concern. Even if, unlike Illinois, a state did not give credits for tax paid to other states, a multistate customer could adjust its payment practices to avoid any problem of overlap.



# The argument for buying a V.32 modem seems to be stacked in our favor.

Here's the argument. You've probably been looking to save on the high cost of dial lines. But you don't want to transmit at greater speeds if it means sacrificing reliability. Especially for critical applications.

The solution? Codex. Our V.32 modems offer proven reliability. We have the largest installed base of V.32 modems worldwide. For applications including leased line back-up, off-hour polling, disaster recovery, fast transmission of CADD graphics and more.

Our modem exceeds the CCITT V.32 standard for full

duplex transmission. With features like phase roll compensation and long haul echo cancellation to ensure flawless operation at high speeds (to 9600 bps) in sync or async environments.

Call 1-800-426-1212 ext. 7216 for our

new V.32 applications booklet.

You'll see when it comes to high speed dial modems, nothing stacks up to the Codex V.32.



**codex**



The Networking Experts



■ TECHNOLOGY WATCH

## U.S. FIRMS WANT TO BE PART OF NEW HIGH-TECH TV PICTURE

**S**mile! You're on Candid Computer!

Too futuristic to think about now? Stop and think again. The cross-pollination of computer and television technologies is under way, with the competition heating up between Japanese, European and American manufacturers.

Sony Corp. has applied to the U.S. Defense Advanced Research Projects Agency for funding that the agency has set aside for high-definition television (HDTV) research. Using high-resolution displays and image-processing technologies, HDTV delivers images that are sharper and more detailed than

those that are currently available.

The technology will be made more attractive by the advent of digital sound.

AT&T and Zenith Electronics Corp. say they intend to co-develop a system to deliver HDTV quality to the home market for now and are focusing their efforts on transmission, production and reception equipment. They are also seeking a chunk of the DARPA funds, which total \$30 million.

As other firms consider the market, computer industry leaders are planning a for-profit U.S. consortium to exploit the hardware and software opportunities expected to proliferate in the wake of HDTV's acceptance in the consumer market.

*A U.S. consortium of companies has been formed to exploit the opportunities in the wake of HDTV's acceptance.*

"You've really got to think of it beyond television," says a spokesman for Digital Equipment Corp., which defines the technology as the digitized integration of voice, video and data.

David Nelson is also thinking beyond TV.

Earlier this year, the chief technical officer at Apollo Computer, Inc. stepped down to launch Confluent Systems, Inc., a company that will meld such technologies as full-motion video, optical devices and more sophisticated computing to allow for greater input and manipulation of data in a single box.

Nelson's venture follows in the footsteps of another Massachusetts startup, MRS Technology, Inc. in Chelmsford. The 2-year-old company is busy cranking out equipment for flat-panel display screens, which may replace the giant screens now used to show HDTV images.

The flat-panel technology, combined with HDTV's attributes, may eventually make the traditional computer screen obsolete. — BY HELEN PIKE

### QUOTABLE

"CRAY IS ONE OF MY FAVORITE MACHINES. WE USE IT AS A MINICOMPUTER."

★ Arno Penzias, VP of research  
AT&T Bell Laboratories

## IBM SAA PRODUCTS PREPARED FOR TAKEOFF

IBM's Systems Applications Architecture (SAA) — the company's future platform for networked applications — continues to go from theory to practice.

IBM is readying a Personal System/2 programmable workstation designed with SAA in mind, according to consultant David Andrews, president of ADM, Inc. in Cheshire, Conn.

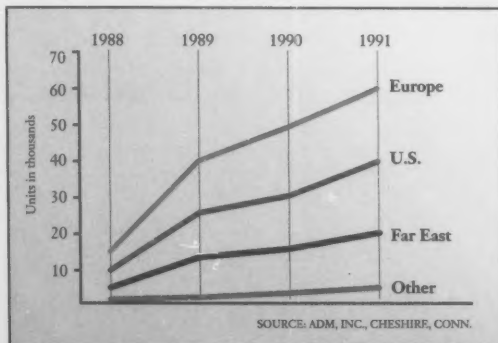
The workstation's first program will be an office application that will have a decision support module as one of its key features, he adds.

But new software doesn't stop there. In June, IBM is expected to unleash a blitz of programs for users of the Application System/400, a pivotal component of its SAA strategy.

Included in the early summer announcement is Release 2 of AS/400's operating system that is designed for cooperative processing and connectivity, especially to the new PS/2 workstation, Andrews says. — BY HELEN PIKE

### Middle management

Forecast of minimum AS/400 worldwide unit sales





IBM  
3090

## For years, we believed that 4GLs should run only on a mainframe. Now we're divided on the issue.

For hundreds of thousands of mainframe users, NOMAD's relational design, rich language, and windowed user interface have set new standards in 4GL productivity and performance.

Now, with recent advances in PC technology, we're separating ourselves from the competition in another way. With versions of NOMAD for your mainframes, minicomputers, and PCs that deliver on the promise of true cooperative processing.

Instead of simply transferring files between mainframe and PC, NOMAD now shares the actual processing in a dialogue between your machines.

For example, by distributing tasks like menu and window management, data validation and report generation to the PC while conserving mainframe power for simultaneously processing transactions against a shared database, NOMAD reduces its use of mainframe resources by as much as 75 percent.

Impressive as that sounds, it's but one of the innovations responsible for widening the technical gap between NOMAD and other 4GLs. We're also the first to develop a common windowing capability and implement referential integrity across multiple hardware environments.

So if you're looking for a 4GL that will boost user productivity, offload your mainframe, and handle your toughest applications, keep in mind that the best decision is a split decision. NOMAD. From Must.

**MUST** SOFTWARE  
INTERNATIONAL  
Making 4GL a language anyone can speak.



For more information, write to Deborah Evans Cox, at MUST Software International, 101 Merritt 7, Norwalk, CT 06856. Or call 1-800-441-MUST.  
NOMAD is a registered trademark of U3S International Ltd.

Circle Reader Service Number 6

# THINK profit

Savvy integration planning can  
turn a poor economic outlook  
into better financial times.

BY HELEN PIKE

**T**HE MIDWEST. A REGION of America where companies harnessed rivers such as the Mississippi and the Ohio to transport their products to competitive markets. But the character of that competition is changing. To net greater profits, these companies are trafficking more in raw data than in commodities. Instead of navigating nature's waterways, today they are integrating rivers of information to bring in greater revenue.

As the markets they serve churn with restructuring, four companies serving four different industries are integrating their individual data operations to meet financial objectives. They are in the fields of health care, retail building supplies, chemicals and telephone services. Though headquartered in the Midwest, these companies have integrated business and technology in strategic plans that may serve as blueprints for enterprises in similar positions elsewhere in the country.

To go anywhere with an integration plan, the first step is to understand the business climate in which a company finds itself. For executives at Payless Cashways, Inc. in Kansas City, Mo., that meant coming to grips with four years of lackluster profit growth.

With 195 nationwide stores dedicated to retail building materials, Payless Cashways had annual sales of

\$1.9 billion in its latest fiscal year but also found out that cheaper competitors were boring holes in its profits. Senior management at the privately held company knew it had to come up with a plan that would plug the holes and throw off rivals.

"The strategic plan was to shift business from serious do-it-yourselfers to contractors and tradesmen sales," explains Vince Heiker, IS vice-president. As part of getting closer to this new customer, the company is contemplating a networking scheme between headquarters and the retail stores for a more accurate flow of inventory.

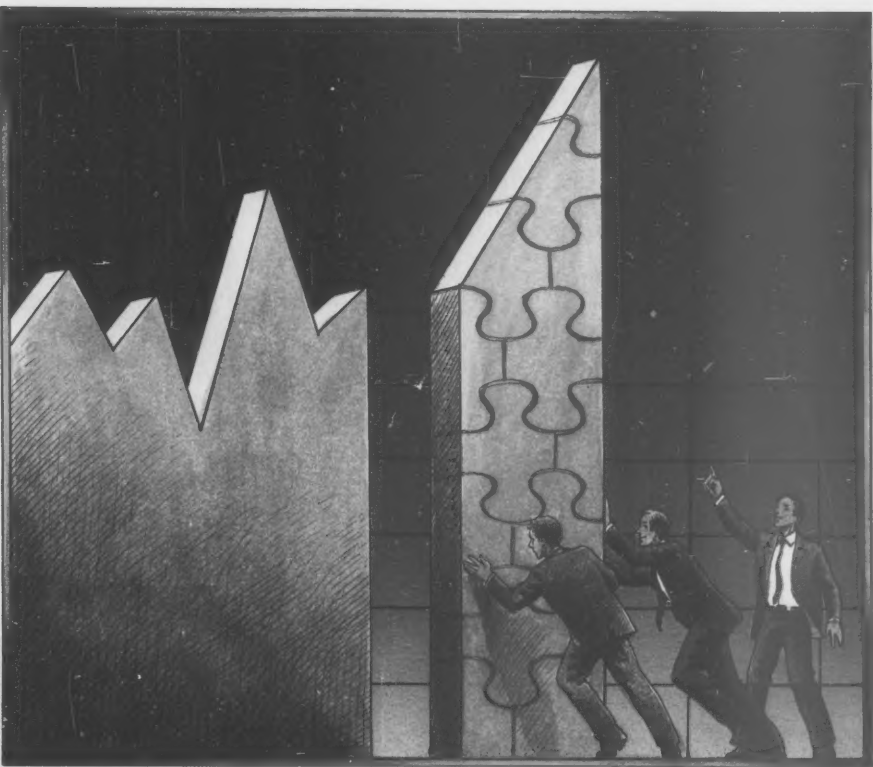
Lower-cost competitors are also a bane to the hospital industry. Although the site of the world's first artificial heart implant, Humana, Inc. in Louisville, Ky., is grappling with

an occupancy rate that is less than 50% in its 84 hospitals scattered across the Southeast, West Coast and Europe.

Despite annual revenue of about \$4 billion, "the hospital business is in the doldrums," says Joe Vincent, technical planning director at the medical facility, "because people are going more to walk-in clinics.

"We're not volume-driven," he adds. But like product-generating firms, Humana decided a business goal lay in delivering "timely decisions based on quality data. [It's] more important than in the past."

The business plan for one of the world's largest chemical companies meant coming to grips with a broad product diversity. Monsanto Co. in St. Louis decided to get out of the chemical commodities arena and con-



solidate around its core agricultural/chemical research. To strengthen this position and get a leg up on the competition, it bought into the pharmaceuticals industry with the purchase of G. D. Searles Co.

The marriage of Monsanto and Searles is one based on information sharing. Discoveries that yield bug-resistant corn, for example, might also lead to the production of better insulin, says Leonard Cohn, IS vice-president and one-time company chemist. Such finds are the result of cross-research and development in animal, plant and human sciences, he says.

The ceaseless quest for cost savings and greater computing efficiency motivated Southwestern Bell Telephone Co. to come up with a plan to streamline its data operations

in 1975. Bloated DP operation had resulted partly from an increase in technology that had, over the years, spawned more and bigger computer purchases.

With 16 data centers in a five-state area, "we were having trouble meeting schedules. The data throughput was slow. The training was slow. Everything seemed slow," recalls Kenneth Bender, IS vice-president, in a recent interview at the company's St. Louis headquarters. "We were so big and didn't have the hardware and software to give customers data in one easy form."

And waiting in the wings was the deregulation of AT&T that would create the seven holding companies, each with its own regional business goals.

The commercial objective at

Southwestern Bell Telephone, then, became how "to get the right data to the right user at the right time," Bender says about the strategy that also mandated a \$16 million cost savings.

Clearly, Southwestern Bell had come face-to-face with the next step in drafting a plan that helps a company retain its competitive position in a turbulent market: defining how integration will be used to implement a company's revenue objective.

At Southwestern Bell, an internal study revealed there were a lot of redundant applications along with the overequipped DP operations. Integration, therefore, came to mean downsizing operations; in effect, consolidating data centers over the five-state area.

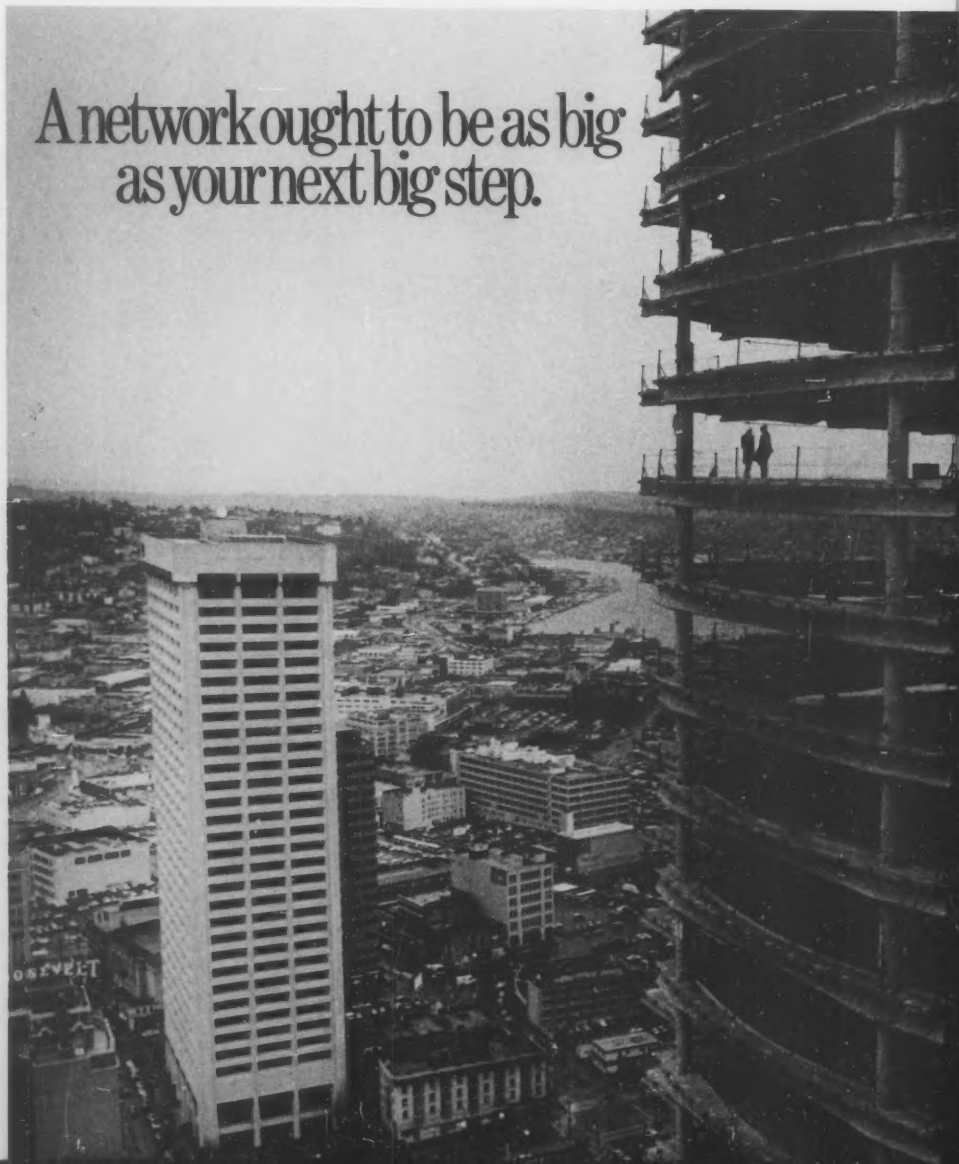
At Monsanto, integration came to



If you're the kind of company that expects to break new ground, you're going to need a network that already has. Because in order to support your rapid rate of expansion, your network has to be able to grow as fast as you do.

Banyan is designed to keep up, no matter how big you get or how fast you grow. Our VINES™ network operating system lets you add new users without interrupting network operation, regardless of where the users are located. And

A network ought to be as big  
as your next big step.



Banyan servers are built to keep network performance high, long after other servers bog down.

Before your company advances any further, call 1-800-828-2404 or write Banyan Systems, 115 Flanders Road,

Westboro, MA 01581. That way you can be sure your network will always be one step ahead.



Networks for those who think big.

Circle Reader Service Number 7

*Two Union Square Building, Seattle, WA Turner Construction Company*



## CRUSADING AGAINST COMPLACENCY

**GARY KIRKHAM** isn't a shy individual.

"I come from the trenches," he says about his IS days at oil conglomerate Atlantic Richfield Co. and chemical and machinery giant FMC Corp. "I was born in the ranks." But those ranks weren't so willing to acknowledge one of their own when Kirkham switched to the ranks of consultants to sell the concept of integration planning.

"We had gotten inefficient, fat, dumb and happy," Kirkham says, blasting his former profession about the excesses he feels it got mired in when the Midwest's economy took a downturn. "I'd knock on the doors of MIS, telling them I could save them money. No soap.

"Finally, I found it was easier to schedule appointments with the CFOs, CEOs and COOs. The guys in DP were trying to shore up crumbling empires while the top guys knew DP was a money hole they were pouring resources into."

Kirkham is executive director of Forecasting Planning Associates in Dallas, and he gets brought in by top executives to get the IS staff to answer the uncomfortable question: Is what I have right now effective and as efficient as it should be?

Kirkham advises IS to align its applications with the company's business lines, especially with those parts of the company that produce profits.

If you don't want a Kirkham-type character to knock on your door, he suggests going on the offensive and asking executives to allow IS to get in on the early stages of the business decision making process. Then, get the chief operating officer to champion your cause, he says. Next, convince a crackerjack technician and a good businessman to sign up for your integration team.

Kirkham also believes in a five-year skeletal plan for integration, one in which IS "front-loads the plan with projects with the biggest payback." Those projects tend to be "the easiest [ones] to do, and they bring in the money quickly," he says. But he is quick to warn that a five-year plan should not result in creating another institutional and, therefore, complacent approach to IS.



mean the combination of physical, electronic and people resources, according to Cohn. The company wanted to take care of business internally in order to take better care of the customer externally, he adds.

Cohn predicts Monsanto's "Plant

of the '90s," in which data from the process control systems is integrated into the manufacturing of products, will evolve into being called "Business of the '90s" as the integration strategy brings Monsanto closer to its customer.

In going through the definition phase, Humana made a distinction between data integration and technical integration, Vincent says. Data integration is more software oriented, while technical integration is more grounded in physical media.

**Monsanto's  
Cohn  
sees the  
company  
headed  
closer  
to its  
customer.**



MIKE VETTER/GAMMA LIAISON



**Heiker defines integration as networking and software support for Payless Cashway's new, more sophisticated client base.**

---

"Integration rolls easily off everyone's tongue," he observes wryly. "It's a mental concept. Trying to get a consensus is where we are."

For Payless Cashways, integration is seen as networking projects, inventory management systems and software support that will increase contractor sales.

With business objectives firmly

fixed and integration clearly defined, the next strategic planning step for most companies is to implement the appropriate technology.

A year ago, Humana established a three-member department within IS to look for ways to apply its technical tools to business problems, according to Vincent. One way is taking a careful look at what the facility's chief

vendor, IBM, is doing internally with its "data repository or data warehouse" — a concept that is expected to yield a commercial product within a year, he says.

According to Vincent, the repository design calls for centralized applications that allows users to create and manipulate data instead of applications that merely centralize data.

**Southwestern Bell's Bender heeded the call to streamline DP operations.**

---



WILLIAM FORSTFELD



This approach is appealing to Humana because it could allow the facility to make better use of its health care data, he says.

#### **SWAT team**

But Humana knows time is of the essence in implementing an integration plan that will revive its profit growth. Referring to himself and his two colleagues, who were appointed because of their business backgrounds, Vincent says, "We are more a SWAT team than a think tank."

Payless Cashways is considering a strategy that is based as much as possible on standards, according to Heiker. The standard architecture in this case is IBM's MVS/ESA, with the vendor's SQL database running across all the company's mainframes, minicomputers and personal computers, he explains.

The plan calls for a migration to CICS and the possibility of a wide-area network in the 1990s. As Payless Cashways reaches out to a more

sophisticated builder, the company is formulating plans for an inventory management system and networks between headquarters and its retail stores.

Telecommunications networks feature prominently in Monsanto's integration plan. There are major fiber-optic links between Chicago and St. Louis and videoconferencing capabilities from the U.S. to R&D facilities in Belgium.

Elsewhere, by using expert systems in its manufacturing plants, Monsanto is able to optimize, for example, its maintenance scheduling, Cohn says.

#### **Getting small**

While increases in technology have spawned more and bigger computer purchases over the years at Southwestern Bell Telephone, the upgrades in computer memory and speed helped spur the telephone company's downsizing as did telecommunications technology, such as VTAM networks and T1 carriers,

that connect the remaining four centers in its regional area.

Consolidating applications, closing data centers and moving personnel resulted in a \$22 million cost savings by 1988, \$6 million more than was in the original business plan, Bender says, with obvious pride. Per data center, the closings averaged a \$5 million to \$10 million savings, he adds.

"There's nothing magical," Bender explains. "A really good group of highly motivated technical experts and miniaturization [of computer technology] did it."

As the executives from these four organizations illustrate, it is the integration of business acumen and technical pragmatism, not any kind of hocus-pocus, that prepares a company for an increasingly competitive — and global — market. Clearly, the information systems executive who recognizes the valuable role data has in his company is in the advantageous position to navigate his organization's fiscal future. ♦

## **DATA EXPRESS™**

### **THE BASIC NECESSITY FOR 21<sup>ST</sup> CENTURY COMMUNICATIONS PROCESSING.**

**DATA EXPRESS™** Modular in design, committed to meeting open architectural standards, and built for the decade to come, **DATA EXPRESS™** is today's answer to tomorrow's needs. Tomorrow's solution, today.

- **Open System Architecture**  
Expandable  
Modular  
Flexible

- **High-Speed Communications**  
IBM host channel connections  
Support of wide range of protocols  
On-Line Transaction Processing
- **State-of-the-Art Hardware**  
Multiple 32-bit micro-processors  
High system reliability  
Based on VME bus structure

- **Service and Support**  
Comprehensive diagnostics  
Field supported dial-in capability  
Nationwide field service and support organization

COMPUTER COMMUNICATIONS, INC.  
Toll Free 800-421-1178  
Outside CA  
213-320-9101  
Inside CA





**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business

Basic Rate: \$48 per year

\* U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E49CF-3



**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business

Basic Rate: \$48 per year

\* U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E49CF-3

- 1. BUSINESS/INDUSTRY** (Circle one)  
 10. Manufacturer (other than computer)  
 20. Financial/Insurance/Real Estate  
 30. Medical/Law/Education  
 40. Wholesale/Retail Trade  
 50. Business Service (except DP)  
 60. Government — State/Federal/Local  
 65. Communications Systems/Public Utilities/Transportation  
 70. Mining/Construction/Petroleum/Refining/Agric.  
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals  
 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting  
 90. Computer Peripheral Dealer/Distributor/Retailer  
 95. User Other \_\_\_\_\_  
 99. Vendor Other \_\_\_\_\_ (Please specify)

- 2. TITLE/FUNCTION** (Circle one)  
**IS/MIS/DP MANAGEMENT**  
 19. Vice President, Asst. VP  
 21. Dir. Mgr. Suprv. IS/MIS/DP Services  
 22. Dir. Mgr. Suprv. of Operations, Planning, Admin. Services  
 23. Dir. Mgr. Suprv. Analyst of Systems  
 31. Dir. Mgr. Suprv. of Programming  
 32. Programmer, Methods Analyst  
 35. Dir. Mgr. Suprv. OAMP  
 36. Data Comm. Network Systems Mgt.  
**OTHER COMPANY MANAGEMENT**  
 11. President, Owner/Partner, General Mgr.  
 12. Vice President/Asst. VP  
 13. Treasurer, Controller, Financial Officer  
 41. Engineering, Scientific, R&D, Tech. Mgt.  
 51. Sales/Mktg. Mgt.

#### OTHER PROFESSIONALS

66. Consulting Mgt.  
 76. Medical, Legal, Accounting Mgt.  
 86. Educators, Journalists, Librarians, Students  
 90. Others \_\_\_\_\_ (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant:  
 A. Mainframes/Supergroups  
 B. Minicomputers/Small Business Computers  
 C. Microcomputers/Desktops  
 D. Communications Systems  
 E. Office Automation Systems  
 F. No Computer Involvement

- 1. BUSINESS/INDUSTRY** (Circle one)  
 10. Manufacturer (other than computer)  
 20. Financial/Insurance/Real Estate  
 30. Medical/Law/Education  
 40. Wholesale/Retail Trade  
 50. Business Service (except DP)  
 60. Government — State/Federal/Local  
 65. Communications Systems/Public Utilities/Transportation  
 70. Mining/Construction/Petroleum/Refining/Agric.  
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals  
 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting  
 90. Computer Peripheral Dealer/Distributor/Retailer  
 95. User Other \_\_\_\_\_  
 99. Vendor Other \_\_\_\_\_ (Please specify)

- 2. TITLE/FUNCTION** (Circle one)  
**IS/MIS/DP MANAGEMENT**  
 19. Vice President, Asst. VP  
 21. Dir. Mgr. Suprv. IS/MIS/DP Services  
 22. Dir. Mgr. Suprv. of Operations, Planning, Admin. Services  
 23. Dir. Mgr. Suprv. Analyst of Systems  
 31. Dir. Mgr. Suprv. of Programming  
 32. Programmer, Methods Analyst  
 35. Dir. Mgr. Suprv. OAMP  
 36. Data Comm. Network Systems Mgt.  
**OTHER COMPANY MANAGEMENT**  
 11. President, Owner/Partner, General Mgr.  
 12. Vice President/Asst. VP  
 13. Treasurer, Controller, Financial Officer  
 41. Engineering, Scientific, R&D, Tech. Mgt.  
 51. Sales/Mktg. Mgt.

#### OTHER PROFESSIONALS

66. Consulting Mgt.  
 76. Medical, Legal, Accounting Mgt.  
 86. Educators, Journalists, Librarians, Students  
 90. Others \_\_\_\_\_ (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant:  
 A. Mainframes/Supergroups  
 B. Minicomputers/Small Business Computers  
 C. Microcomputers/Desktops  
 D. Communications Systems  
 E. Office Automation Systems  
 F. No Computer Involvement



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



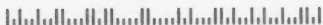
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



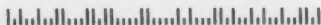
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



How large is Computerworld's  
total audience of  
computer-involved professionals?

**620,000\***

---

That's because we're the newspaper of record for information systems management. If you're still on the routing list instead of the subscriber list, now's the time to get your own copy of **COMPUTERWORLD** delivered fresh every week.

It will give you a complete rundown of everything that's happening in the computing arena. You'll stay on top of the news & nuances of the industry and the praises and problems of its products.

Don't delay, order now. You'll get 51 information packed issues. Plus special bonus sections of **COMPUTERWORLD** Focus on Integration. You'll also get our special Spotlight section . . . featuring detailed head-to-head comparisons of the industry's latest products.

Use the postage paid subscription card bound into this issue and get your own subscription to **COMPUTERWORLD**.



\*Audit Bureau of Circulations Supplemental Data Report, May 25, 1987



# PC LAN control

## WHO HAS IT, WHO DOESN'T

**T**HE DAYS OF US VS. THEM, of information systems staff against users, is pretty much on its way out, at least where PC LANs are involved. In this area of computing, no single corporate group is in complete charge. Though problems remain, cooperation is becoming the norm, not the exception.

Information systems departments, network administrators and end-user groups each share part of the responsibility for dealing with local-area networks, and, miracle of miracles, the division of labor usually lets all parties to do what they do best.

The computer people tend to handle the technical decisions, and the business users tend to handle the software and applications.

Where once IS managers ignored personal computer networks or hoped they would go away, they now realize the low-price network is here to stay. Most also now understand that users, who initiated most of the networks, must stay involved.

Everything with LANs is not hunky-dory, of course. Technical difficulties abound, personal egos are still at stake, IS has not suddenly reshaped itself in the image of its users, and many companies' LAN policies are in a state of flux. Furthermore, the organizational structures that work in one corporate setting don't necessarily work elsewhere, so there are no easy rules to follow.

One organizational change has been prominent. Business units needing support for their LANs have commonly had to form their own technical groups. Now these groups have increasingly become part of the corporate computer department.

"Our experience with Fortune 500 companies," says Ronald Evans, who follows such trends for Nolan, Norton & Co. in Lexington, Mass., "is that 80% to 90% of end-user computing groups report to IS. It's not an either/or situation. They all figured out that computing is computing, no matter who controls it."

The degree of joint responsibility is best seen in the LAN purchase decision, which has been analyzed in a report by Infonetics, Inc., a research firm in Santa Clara, Calif. (see chart page 28). While managers with cor-

porate-level duties, such as systems administrators and IS managers, had a lot of influence more often than anyone else, people with close ties to the business function, such as departmental managers and work group managers, had a significant say almost as often. Furthermore, the survey also showed that all groups, except users, were involved to some degree in purchase decisions at least 80% of the time.

Whatever the organizational setup, the LAN decision making process is basically the same.

At GTE Florida, Inc. in Tampa, for example, the money for networks comes out of the corporate information management budget. "But while we actually control it, we build the budget based on departmental needs," says Lanny Russell, director

BY MARK BREIBART

of management support systems. Users wanting a LAN come to the support group, and together they figure out what is needed and then include that in the budget, Russell explains.

More commonly, the dollars and formal authority reside with the department. Blair Ensinger says that at Bausch & Lomb, Inc.'s Professional Products Division in Rochester, N.Y., departments pay for network equipment out of their own capital budgets. But, adds this systems project manager, people in his division-level group act as budgetary consultants to the departments, spec'ing out the requests, giving guidelines for expected expenses and even writing

up the purchase orders.

One reason corporate IS has gotten involved with PC networks is cost control. Though LANs aren't usually big-ticket items compared with mainframes or even minicomputers, they do require a lot of expensive, people-intensive support.

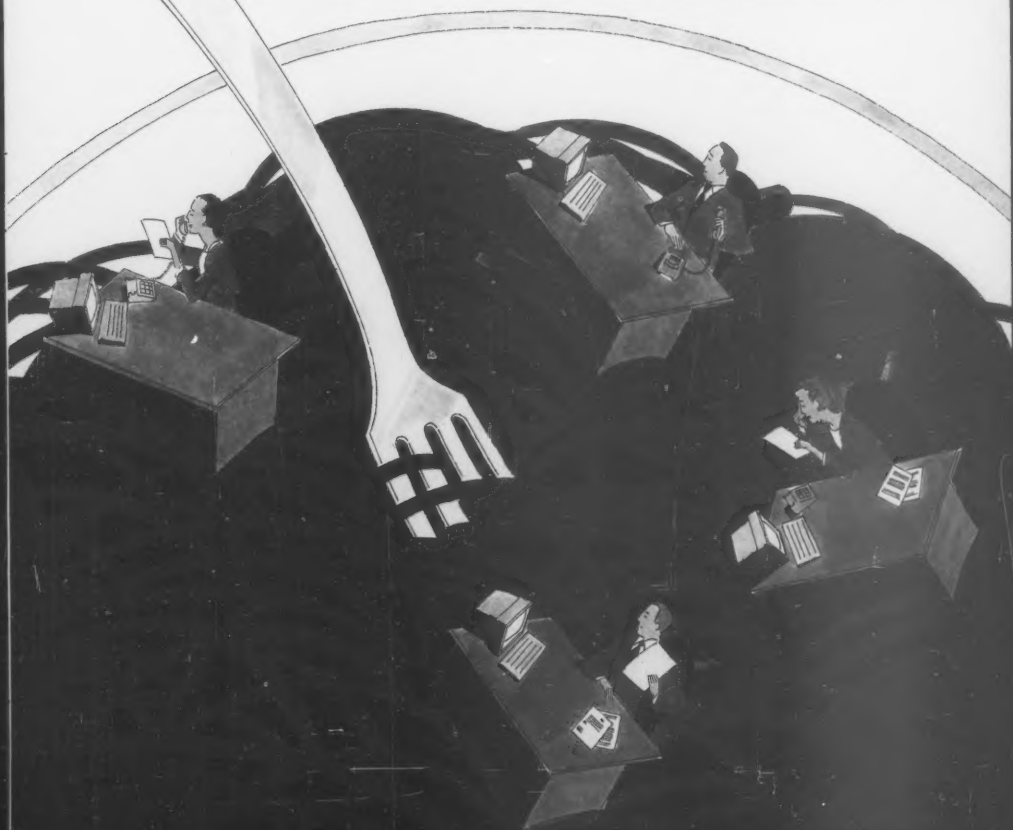
By organizing LAN support groups or bargaining for corporatewide maintenance contracts with outside vendors, IS managers can often save more money than if each network administrator went it alone. Furthermore, for plugging users into the corporate mainframe, network gateways are often cheaper than buying emulation boards for each PC.

Information planners are also beginning to see networking as a valid computing strategy. "If you look at the LAN as a corporate information

resource — and we do — you've got to [get involved] to set the standards," GTE's Russell says. "Otherwise, nothing will be able to connect, or only with a lot of work."

#### Banking on LANs

Citicorp's Investment Bank in New York had no organized corporate support for its first LAN, brought in about six years ago. But as work groups were added to the now 300-node network, bank managers began to realize that LANs were a pretty effective way to distribute video feeds, pool modems and provide electronic mail, says Roger Bender, a Citibank vice-president in charge of microcomputing and LAN support. The bank has centralized responsibility in a LAN support group for those and other networkwide functions.



Many corporations, to be sure, haven't decided on how LANs fit into the corporate strategy. The networks are often, after all, still the new kid on the block. More than 80% of personal computers are either stand-alones or tied directly to the mainframe, and current networks tend to be small, averaging 14 nodes, according to David Perro, an industry analyst at Dataquest, Inc. in San Jose, Calif.

At a major U.S. Northeastern insurance company, where about 10% of the PCs are linked into 50 LANs, "a lot more attention is now placed on that platform than three years ago when top managers wouldn't admit it existed," says Carl Miller, an internal PC network consultant at the company. But while senior management has now endorsed the technology, he adds that there is no well-defined organizational structure to make sure users are getting as much from their LANs as possible.

As IS does get involved, user-oriented managers lose a measure of control. In a way, departmental LAN support people have been the victims of their own grassroots success.

Once the first network was in place, "someone from a different department would come by, see what

## Departmental LAN support people have been the victims of their own grassroots success.

was happening and say, 'I like what you're doing here,'" recalls Tim Crowell, vice-president of LAN support at the First Republic Bank in Dallas. But when there were two LANs in place, users realized they were duplicating efforts. They then got IS involved to try to avoid redundancy. "It was a natural evolution," Crowell adds.

LANs also introduced a level of technical complexity that users either didn't want or were unable to handle. Network users at eyewear company Bausch & Lomb are accountants, chemists and marketing managers with their own jobs to do, Ensinger points out.

"It's virtually impossible for even power users to keep up with all the technical changes," he says.

Sometimes, however, users can get out from underneath the technical problems completely. At Florida Power & Light Co. in Miami, an IS user-access services group usually takes care of the Novell, Inc. software that runs the network, says group manager Bill Wallace. The IS telecom people deal with the hardware, such as the token-ring cards, the cabling and the gateway.

More often, however, network managers work within the department as part of a three-tier structure that includes a corporate-level support group on top and the end users on the bottom. Bart DiMaso, vice-president of Office Systems Consulting at Shearson Lehman Hutton, Inc. in New York, describes the network manager as "a junior technical type who knows the business environment."

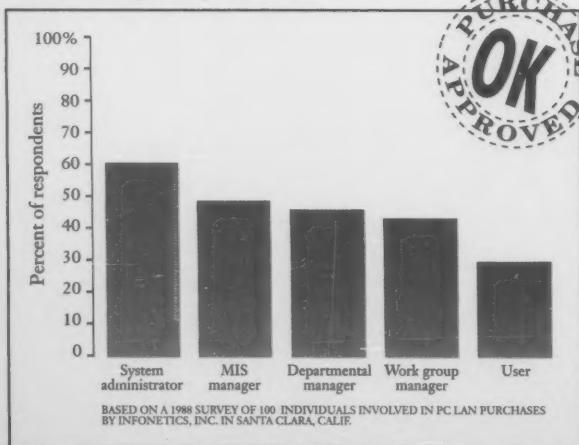
DiMaso's group, which is within the IS division at Shearson Lehman, then acts as an advisory group, as a "second level of defense" for users after the network administrator.

The main goal of the work group-level people, Citibank's Bender adds, is "to be concerned with the functionality" of the network, not the technical issues. The support group will help them, but applications software has been the responsibility of the work group, he says.

Despite the changes made by many corporations, the issue of control is still "a very delicate one," says Crowell. Even though users at the First Republic Bank had asked for corporate help when their LAN got large, they are still afraid of losing control of the system they built. The bank, recently taken over by the North Carolina National Bank, is, in fact, taking the opportunity of the management change to re-evaluate its LAN policies.

Even for those who believe their way works well, cooperation between IS and users requires constant vigilance. GTE's Russell says his company set up a separate information center within IS because without it, "users would never get the kind of attention they deserve. We had to get their needs out of competition with systems development in order to give them priority."

## Whose influence counts the most when deciding to buy PC LANs?





# Your Connectivity Source

Getting today's diverse computer systems to communicate with each other is one of the toughest operational tasks you may face.

While others have been talking about the problem, Mitek Systems has developed a range of *OpenConnect*™ solutions for system connectivity. The Mitek OpenConnect approach means your IBM® host can talk back and forth to your VAX, AT&T 3B, HP, IBM PC, Apollo, Sun, Tektronix workstations, and just about any other system, including those you may need in the future.

Mitek OpenConnect solutions are now in many of the Fortune 500 companies and in some of the world's largest data centers. Let Mitek's OpenConnect approach help solve your connectivity problems. Call today:

(214) 490-4090



Corporate Headquarters  
2033 Chennault Drive • Carrollton, Texas 75006  
(214) 490-4090 • FAX: (214) 490-5052



© Copyright 1989 by Mitek Systems, Corp.  
IBM, OpenConnect is a trademark of Mitek Systems Corp. • IBM and related trademarks of International Business Machines Corporation.  
VAX is a trademark of Digital Equipment Corporation. HP is a trademark of Hewlett-Packard Corporation.  
Apollo is a trademark of Apollo Computers, Inc. Sun is a trademark of Sun Microsystems, Inc. Tektronix is a trademark of Tektronix, Inc.



# ON THE **f a s t** TRACK

BY HELEN PIKE

**J**AMES A. SHATTUCK is not working on the railroad to pass the time away. Quite the contrary. At Union Pacific Corp., time is money. Fierce competition in the freight industry is pitting carrier against carrier. In the aftermath of a deregulation process that began in 1980, railroad and air freight firms have been snapping up trucking fleets to protect their profit margins and expand their share of the transportation market.

Against this backdrop, Shattuck, an information systems executive, and other top professionals at Union Pacific Railroad and corporate parent, Union Pacific in Bethlehem, Pa., are reassessing their competitive future: Does Union Pacific want to be just another railroad company, or are there opportunities out there to provide a broader range of integrated services?

Results of a diversification effort already answer part of that question. In 1987, Union Pacific earned \$583 million on revenue of \$5.9 billion, most of that from five profit-and-loss columns dedicated to transportation, energy, natural resources, hazardous waste management and real estate development.

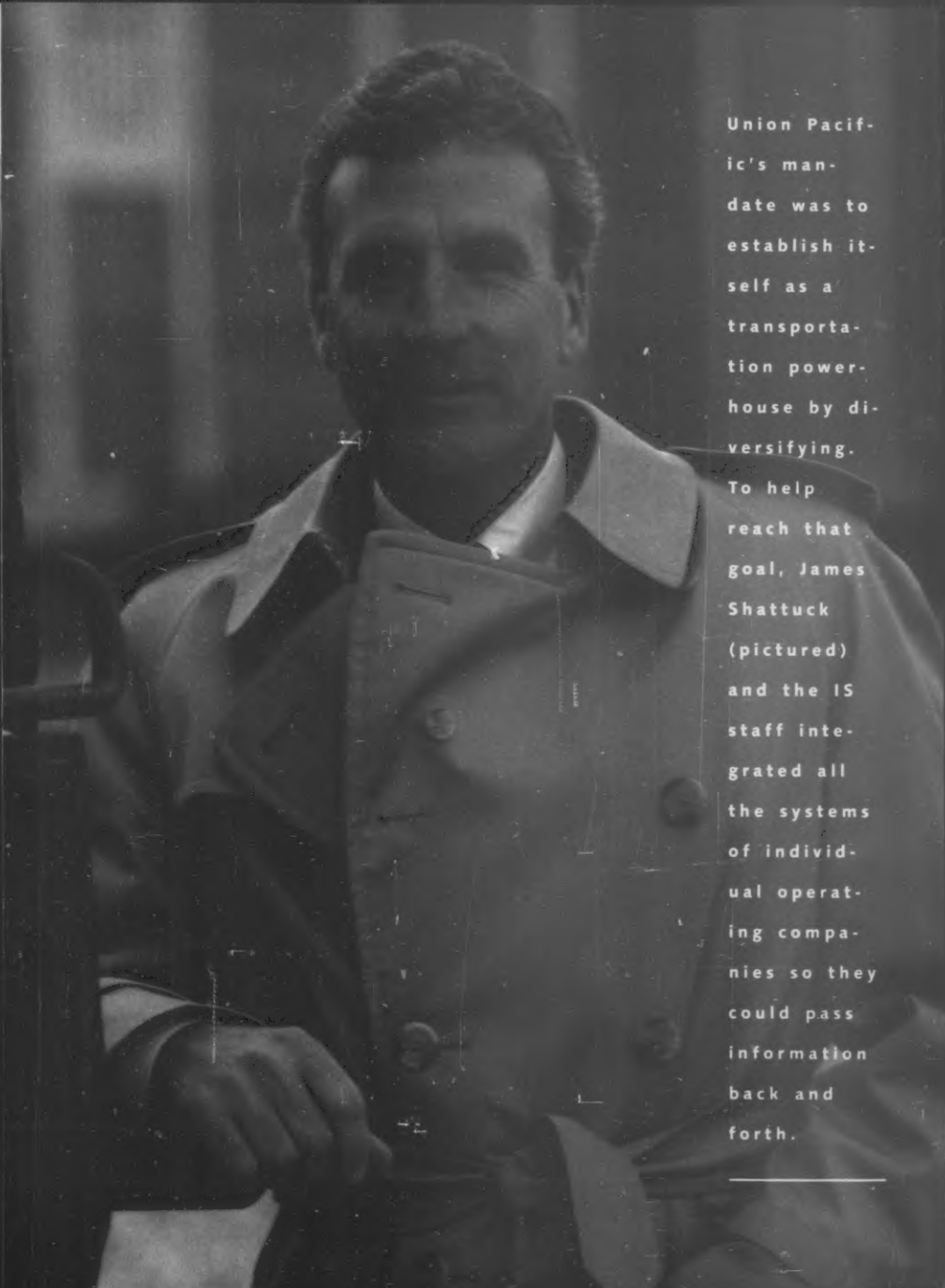
Then, in May 1987, the corporation went a step further and established a sixth P&L, this one from within the

core of its operations — specifically, its information processing operations. It created Union Pacific Technologies (UPT) to answer further the question of how to broaden its business by integrating information technology.

UPT, based in suburban St. Louis, is the hub for Union Pacific's customer support. It carries out a twofold mandate:

- To help sister subsidiaries understand their individual business goals and then develop information systems to support their revenue strategies.
- To leverage internal software development by selling externally the information services associated with transporting freight of any kind on carriers of any kind.

Shattuck, previously assistant vice-president of information systems for the



Union Pacific's mandate was to establish itself as a transportation powerhouse by diversifying. To help reach that goal, James Shattuck (pictured) and the IS staff integrated all the systems of individual operating companies so they could pass information back and forth.

---

# CA DATACOM/DB

## The Best Database Now Comes With A Couple Of Extras.

CA-DATACOM/DB is now supported  
by the technological and financial  
strengths of Computer Associates.

With its unique combination of comprehensive  
RDBMS facilities and unsurpassed performance,  
DATACOM/DB has always been a superior database.

Now backed by our commitment to protect your  
database investment, CA-DATACOM/DB stands  
ready for the future by giving you SQL support  
without costly hardware or software upgrades.

Additionally, CA-DATACOM/DB provides an  
active data dictionary to define, control and protect  
your data. Automated migration software lets you  
convert to CA-DATACOM/DB from VSAM, DBS or  
TOTAL\* without costly rewrites. You can distribute  
data across multiple computer sites, and you can  
get it with CA-RECALL, a complete, 4th generation  
application development environment.

For more information, call back to us at  
1-800-233-0275.

**COMPUTER  
ASSOCIATES**  
Software Corporation

merged data operations of the Union Pacific and Missouri Pacific railroads, was appointed UPT's president and chief executive.

Largely an IBM shop, Union Pacific runs its operations in MVS with TPSS, the corporation's own teleprocessing support system that Shattuck describes as a "homegrown high-transaction rate environment with its own memory management." Union Pacific also runs IBM's IMS, DB2, TSO and CICS and uses Sage Software, Inc.'s Application Productivity Software, a Cobol code generator. It also provides commercial users with a time-sharing service to its various computer systems.

Shattuck and his newly deputized technical staff "decided to integrate all these systems that support the operation of individual operating companies [so they could] pass information between each other," he explains. For example, UPT has helped merge the data centers of Overnite, a Union Pacific trucking subsidiary located in Richmond, Va., with Union Pacific Railroad's data center in St. Louis, thereby helping to make each service complementary and more competitive.

"We have a good base of people with skills from the railroad," adds Shattuck, whose IS career in transportation began in 1963 working for rival rail company Southern Pacific.

Drawing from that railroad expertise, the staff at UPT has designed an \$80 million state-of-the-art transportation control system to manage freight delivery. Three expert systems are featured components, dealing with billing, pricing and maintenance crew schedules.

Using document image processing products from Filenet Corp. in Costa Mesa, Calif., the UPT crew has installed an accounts payable system for billing in Omaha, the railroad's dispatch center, and a revenue accounting system in St. Louis to keep better track of sales. It is also trying out a hand-held bar code scanner for Overnite's truckers to improve the accuracy in pickups and deliveries.

Also for the railroad, UPT is working on an automated train control system that will monitor and control rail shipments. It will involve

## UPT'S EXPERT OPERATION

**ON FEB. 28**, Union Pacific created a seventh P&L based on some of the integrated design principles of Lincs.

Called Union Pacific Logistics and based in Bethlehem, Pa., the new operating unit will customize shipping arrangements for organizations seeking to improve inventory flow. It is an outgrowth of Union Pacific Technologies' work to meet customer demands for just-in-time manufacturing and delivery.

Using an expert system, UPT enters customer expectations for materials and timetables and then proceeds to monitor shipments on specified carriers until they get to their destination, according to L. Merrill Bryan Jr., UPT's executive vice-president.

"It's designed to better manage customers' inbound flow," says Bryan, who, like James Shattuck, also worked for the Southern Pacific and Missouri Pacific railroads. More recently, he was assistant vice-president of systems development and implementation for the merged data processing operations that resulted when Union Pacific bought Missouri Pacific.

In helping launch Union Pacific Logistics, UPT will act as software developer and implementer, Bryan adds, a part UPT is increasingly playing as the parent company continues its integrated foray into the future.



**L. MERILL BRYAN** wants to help customers improve their inventory flow.

terminals on board each locomotive and transponders along the rail route to gather and transmit data back and forth from a central location to a locomotive. The system is expected to monitor speeds for safety as well as relay information about changes in container pickup and delivery.

UPT has coined a new term for its design — a computer logistical system. But UPT didn't stop there. To fulfill its second mandate, the company went a step further to design the Logistics Information Control System (Lincs) for the commercial transportation market.

By adapting what it has done for Union Pacific's rail, trucking and air freight businesses, UPT has created a database of rates, schedules, weights,

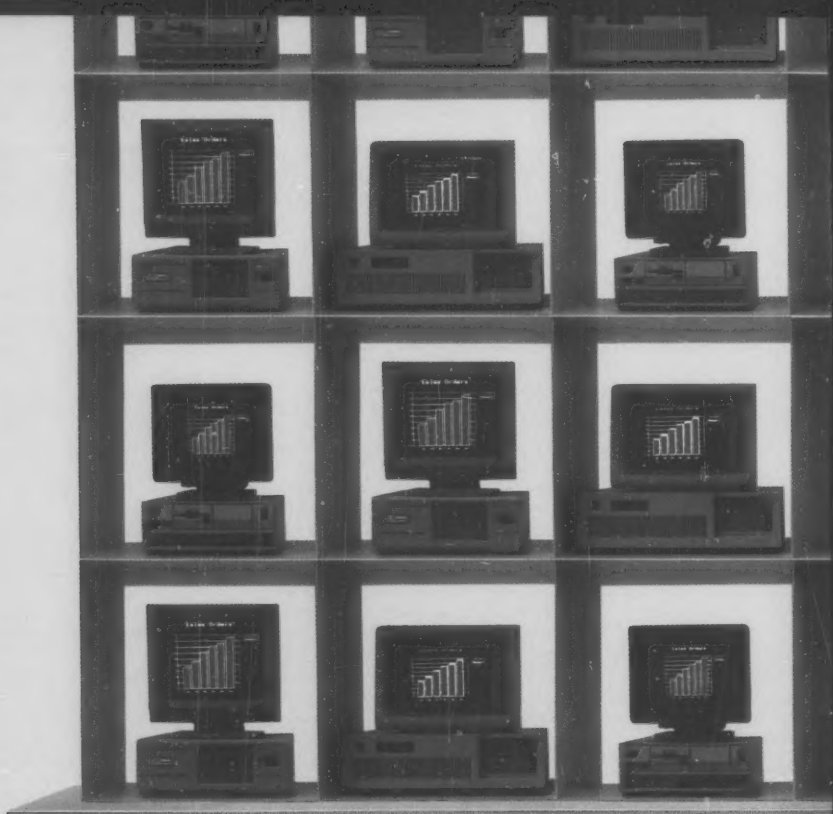
delivery routes and types of carriers and their availability that customers can access through electronic data interchange (EDI). It is data that is particularly useful to customers implementing just-in-time techniques, so much so that a seventh P&L has been formed to address JIT concerns (see sidebar above).

Among the 1,300 EDI customers are other rail firms, banks and GE Information Services. Lincs is expected to be fully operational by 1990 and to generate over 50% of UPT's income from commercial customers by 1992.

Shrugging his shoulders as he says there's no sleight of hand with designing an integrated system, Shattuck adds, with a grin, "It's common sense, but no one does it." ♦

ERIC LUTCHER/SAMM LIAISON





# Novell gateways undergo stress

At Novell, we think the true measure of reliability is real-life stress.

MIS managers tell us that real-life stress means gateways that support dozens of workstations. And that reliability is the single most important requirement. We listened. Then we set the same high product standards in connectivity that we have with NetWare®.

**Optimal gateway reliability.** A single NetWare SNA Gateway supports up to 97 workstations with reliable, simultaneous access to multiple IBM or compatible host sessions.

To prove just how reliable Novell gateways are, we have subjected them to the industry's most demanding high-capacity stress testing. And we're happy



# testing so you won't have to.

to share the results with you. Just call 1-800-LANKIND and ask for our NetWare SNA Gateway Lab Report.

**Ask for NetWare SNA Gateways.** Make the reliable choice when it comes to LAN-to-mainframe connectivity. See your Gold Novell Authorized Reseller about NetWare SNA Gateways.

*For your SNA Gateway Lab Report, or more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter NVSNA7.*



**For network solutions,  
you should be seeing red.**

Circle Reader Service Number 11

# THE BIG payoff IN EXPERT SYSTEMS

**T**WO YEARS AGO, organizations that were building prototype expert systems could consider themselves ahead of the game. Now, organizations stuck in the experimental stage risk finding themselves at a disadvantage. Prototypes are out. Integrated production systems are in.

Bringing expert systems from promising idea to deliverable application has required rethinking one conventional idea about the technology: that it is best suited for unique, stand-alone applications. Most information systems managers still regard expert systems in the context of applications such as automobile repair diagnostics, personal financial planning and oil exploration.

That's a mistake, according to Jay Wurts, chairman of artificial intelligence hardware and software vendor Symbolics, Inc. in Cambridge, Mass.

*FREEDMAN is a free-lance writer based in Brookline, Mass.*

He maintains that "most expert system applications being built today are for operational applications like running factories and speeding credit card transactions."

One of the keys to this expanded role for expert systems has been the development of techniques for integrating these systems into more conventional environments. "Operational systems can't sit in a vacuum," Wurts explains. "They have to get at data, and that means the challenge has been to fold expert systems applications into mainstream systems."

BY DAVID FREEDMAN



STEVEN M. JALE



The need for expert systems to integrate with conventional applications and databases has been the key limiting factor to the success of expert systems, according to John Donovan, chairman of systems integration firm Cambridge Technology Group, also in Cambridge.

"The right artificial intelligence technologies have all been available," he says. "But how do you use them if you can't establish a cost-effective interface to an IBM 370 environment, where most companies' information resides?"

In just the past few years, several vendors have developed techniques for bringing expert systems into conventional environments — and a growing number of customers are finding that the new capabilities fill an important gap. "We needed an expert systems development environment that worked with IBM mainframes," says Roger Schelm, vice-president of applied research at Philadelphia-based Cigna Systems, an information processing arm of insurer Cigna Corp. "It's only relatively recently that expert systems have been able to function that way."

Schelm's group has wasted little time in making integrated expert systems technology pay off, having completed a back-end analysis and report-writing application for a conventionally designed medical insurance information system.

The older system tracks the claims filed by employees that work for Cigna's group insurance customers and provides a tabular report of several categories of claims. The information is important in helping Cigna's customers find ways of lowering their health insurance costs. For example, the data may bring to light

---

**ROGER SCHELM**, president of applied research at Cigna Systems, has wasted little time in making integrated expert systems technology pay off.

---



abuses of benefits like sick time, prompting a change in a customer's internal policies. Or perhaps a customer might find that certain areas of insurance coverage are not being used by its employees, justifying some change in coverage that might save it money.

But getting such information from the conventional system required training Cigna representatives in interpreting and explaining the older, cryptic tabular reports.

However, now the expert system back end combs through the data, identifies areas of potential concern and produces a report that spells out the results in plain English, complete

with recommended courses of action. The expert system module runs on the same mainframe as does the main body of the application and the associated databases, communicating smoothly with them as would any other application.

#### The younger generation

Schelm thinks his system is typical of the new generation of expert systems applications. "Most major efforts in the expert systems area are aimed at front-end and back-end systems for existing applications," he says, "because they're easier to work with and to isolate." Such systems would clearly be useless, he adds, if they

couldn't be closely integrated with existing applications.

MCI International has also developed an expert systems back end to a conventional application. The Rye Brook, N.Y., division of MCI Communications Corp. provides a telex message transfer service for hundreds of U.S. banks that do business with overseas correspondent banks.

Formerly, MCI simply passed the telexes it received on to its customers, leaving the banks with the time-consuming and critical task of sorting through the validation data included with most of the thousands of messages they receive each day. The data verifies the identification of the message sender. "If you're being asked to transfer \$10 million dollars from your bank to another bank, you better make darn sure you know who's asking you to do it," explains Ashim Das, a technical advisor at MCI.

MCI knew it could save its customers a great deal of time by having its system automatically determine whether the message was a money transfer and then pull out and process the validation data. But because much of the information in the messages is written in free-form English and because message formats vary from bank to bank and even from operator to operator, conventional systems weren't up to the task. An expert system was, however. MCI had a back-end expert system built that runs on a pair of Symbolics processors specifically designed to handle AI applications efficiently; the link to the conventional system is established via a Digital Equipment Corp. Microvax acting as a file server.

MCI now provides the expert system-based message classification and validation service to The Chase Manhattan Bank, N.A. and Irving Trust Co. and is talking to several other customers about adding the service. According to Das, the capability is responsible for doubling the volume of messages that Chase and Irving have routed through MCI. "Most of these banks deal with several different telex message carriers besides us," he explains. "Now that we offer this added benefit, the banks tell their correspondents to send messages through MCI. The expert

## YOU ARE HERE

### EXPERT SYSTEMS

are still uncharted territory for many IS managers. The following are a few pointers from managers with first-hand expert systems experience on how to identify and manage opportunities for the technology.

- Identify project needs ahead of time, and specify exactly what it is the system is supposed to do. Don't start with a blue-sky idea and hope the expert system can do most of it.
- Appoint someone to be in charge of expert systems technology for the organization. It's important enough and complex enough an area to warrant a full-time position at larger organizations.
- Don't proceed without a solid and well-thought-out commitment from the highest levels of the organization, otherwise, projects could be torpedoed by erratic funding or by disappointed executives with unrealistic expectations.
- Do extensive pilot testing and validation of the expert system's knowledge base. Even experts don't yet fully understand all the ways in which an expert system can go wrong.
- Do a standard cost/benefit analysis of all projects. Although payoffs will be harder to predict as precisely as those from conventional projects, don't build all your justification around vague, serendipitous benefits.
- Select only projects that have an unusually high payoff-to-cost ratio. As with all young technologies, expert systems are likely to be far less expensive to build in just a few years, so it makes sense to put off all but a few low-risk projects for now.



FOR BILL

# One expert system is on a level all its own.



Only one expert system has all the key ingredients for creating successful applications—LEVEL5.

With over 10,000 users in companies like DuPont, Harris Corporation, and Ford Motor Company, LEVEL5 is certainly one of the world's most widely used expert systems.

LEVEL5 facilitates the transfer of expertise into usable knowledge bases faster than any other product of its kind.

It runs on all the major platforms—IBM mainframe, DEC VAX, PC, PS/2 and Macintosh. What's more, a LEVEL5 application can easily be moved from one platform to another.

Another thing that sets LEVEL5 apart is its ability to read outside databases from all of its platforms. And LEVEL5 also works with all your existing applications.

LEVEL5 is a product of Information Builders, Inc., the developers of FOCUS—the world's leading fourth-generation language. IBI is a \$100 million company and is supporting LEVEL5 from 45 locations worldwide.

So why not stop evaluating and start working? For more information on LEVEL5, call 1-800-444-4303. Or write Information Builders, Inc., 1250 Broadway, New York, NY 10001.

 **LEVEL5**  
Information Builders, Inc.

Circle Reader Service Number 12

## U.S. Companies Involved In ISDN Trials And Service Rollouts

Company	Switch	Access	Carrier	Status	Note
Astra, Hartford, Conn.	AT&T SESS	Basic	Southern New England Telephone	Installation underway	
American Express, Phoenix, Ariz.	AT&T System 85 PBX/ACSS	Primary	AT&T	Started July 1988	First customer of AT&T's Primary Rate
American Telephone & Telegraph, Jacksonville, Fla.	AT&T System 85 PBX/MESS	Primary	AT&T	Started Dec. 1987	Beta test site for AT&T's Primary Rate
Arkansas, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1986, officially ended	
Bentley Co., Seattle	AT&T SESS	Basic	US West Communications	Scheduled start Nov. 1988	
Carnegie Mellon University, Pittsburgh (Research Corp., San Francisco)	AT&T SESS	Basic		Contract pending	
Contel Corp., Atlanta	AT&T SESS	Basic	Southern Bell	Started April 1988	Paying customer
Continental Data Corp., Minneapolis	NEC NEAX 6/16	Basic	US West Communications	Started Nov. 1987, ends Nov. 1988	Test
Duke University, Durham, N.C.	AT&T SESS	Basic	Southern Bell		
Eastman Kodak Co., Rochester, N.Y.	Northern Telecom SL-100 PBXs	Primary		Started Aug. 1988	First Primary Rate using two SL-100s
Federal National Mortgage Assoc., Washington	AT&T SESS	Basic	C&P Telephone	Started June 1988	
F-Cell Data Communications, Chicago (General Instruments, Chicago, Ill.)	AT&T SESS	Basic			
Glaxo Inc., Research Triangle Park, N.C.	SL-1 PBX and DMS-100	Primary/Basic	GTE South	Started June 1988	First Primary Rate/Basic Rate in one trial
Hebrew, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Carolina Telephone	Scheduled start Jan. 1989	
Honeywell Microcomputer Products Inc., Norcross, Ga.	AT&T SESS	Basic	Southern Bell Pacific Bell	Started April 1988 Sept. 1987 to Sept. 1988	Using ISDN to develop ISDN products
Honeywell Perds Corp., Harrisburg, Pa.	AT&T SESS	Basic	Contel of Pennsylvania	Scheduled start Oct. 1988	Will include ISDN satellite transmission
Honeywell Information Systems (Honeywell Bull), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included distance transmission between office and employees at home
Johns Hopkins Medical Center, Baltimore	AT&T SESS	Basic	C&P of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif.	AT&T SESS	Basic	AT&T Federal Systems		
Lockheed Missiles and Space Co. Inc., Sunnyvale, Calif.	AT&T SESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1988	Test
Mass. Institute of Tech., Cambridge	AT&T SESS	Basic		Scheduled customer Oct. 1988	Using AT&T SESS as PBX for private network
Mathur Air Force Base, Sacramento, Ca.	AT&T SESS	Basic	AT&T Federal Systems	Started Aug. 1988	Model for ISDN deployment at 50 bases
McDonnell Douglas Corp., St. Louis		Primary	AT&T	Unannounced	
Missouri Inc., Norwood, Miss.		Basic	New England Telephone	Installation underway	Part of various contract
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Illinois Bell	Planning stage	
NASA, Washington	AT&T SESS	Basic	AT&T Federal Systems		
Nice Corp., Ogden, Utah	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN
Northeast Utilities, Hartford, Ct.	Northern Telecom SL-1s	Primary			PBXs in Rocky Hill Ct. and Meriden, Ct.
Pennsylvania, State of, Harrisburg	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Statewide network with ISDN in Harrisburg
Prest & Whitney, East Hartford, Conn.	AT&T SESS	Basic	SHET		
Prime Computer Inc., Natick, Mass.	AT&T SESS	Basic	Southern Bell	Started April 1988	Paying customer
Rockwell Communication Systems, Richardson, Texas	AT&T SESS with two switches	Basic	Southwestern Bell	Scheduled start Dec. 1988	40 buildings in a campus environment will be linked via ISDN
Shell Oil Co., Houston	AT&T SESS	Basic	Southwestern Bell	Start Sept. 1988	Plan to use 5,000 ISDN lines
Southern Methodist University, Dallas	Siemens EWSD	Basic	Southwestern Bell	Started Feb. 1988	
Southwest Airlines Corp., Atlanta	AT&T SESS	Basic	Southern Bell	Started April 1988	Paying customer
SRI Corp., St. Paul, Minn.	AT&T SESS	Basic	Southwestern Bell	Started Aug. 1988	Plan to use 3,195 ISDN lines
Tenneco Inc., Houston	AT&T SESS	Basic	Southwestern Bell	Started June 1988	Plan to use 3,800 ISDN lines
University of Arizona, Tucson	AT&T SESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T SESS as PBX in private network
University of Connecticut, Storrs	AT&T SESS	Basic	SHET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
University of Maryland, College Park				Unannounced	
University of South Florida, Tampa	AT&T SESS		GTE South	Started Oct. 1987	
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Test
Virginia, State of, Richmond	AT&T SESS	Basic	C&P of Virginia	Started April 1988	
West Virginia University, Morgantown	AT&T SESS	Basic	C&P of West Virginia	Scheduled start Dec. 1988	Plan to use 880 ISDN lines

Note: This chart was compiled by CommunicationsWeek with information provided by Teleco Communications Inc., Easton, N.J., as well as from news releases and published reports. Comments, switch manufacturers and their affiliated subsidiaries are not listed.

# The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

**95% of ISDN lines are on an AT&T 5ESS® switch.**

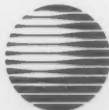
AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—95% of non-trial ISDN lines. What's more, we've already shipped over 200,000 ISDN lines for future use. Today, 99 central offices can offer operational ISDN services over the AT&T 5ESS switch, with a total of 415 upgraded with ISDN software.

So, while other suppliers are still in product development trials, AT&T Network Systems is helping phone companies across the nation offer ISDN services right now on today's network. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail all over a single phone line.

**ISDN is just the beginning.**

We believe that ISDN is the beginning of a bigger future. A future we call Universal Information Services. A future where networks can carry voice, data and image into anyone's office or home at any time in any combination, with maximum convenience and economy.

At AT&T Network Systems, this belief is already driving our technology, our product development and our commitment to you.



**AT&T**

The right choice.



---

# Call For Directory Assistance

The next time your corporate buying team needs assistance with a purchasing decision, make sure you have the INFOMART Directory handy. This free 60 page directory is your guide to everything INFOMART offers.

When you visit INFOMART, you can see and evaluate the latest in computer hardware, software, telecommunications, networking, consulting and training, all in a single convenient location. And you can use our directory to preview the more than 90 companies waiting to meet your technology needs.

Call for your free INFOMART Directory today and ask how our exclusive Executive Briefing Service can assist you even further by coordinating and expediting your entire visit to INFOMART.

**INFOMART.**

Where the leaders in automation  
share their knowledge with you.

## 1-800-232-1022

INFOMART, 1950 Stemmons Freeway, Dallas, Texas 75207  
INFOMART is a registered servicemark of IBM Partnership.

# INFOMART DIRECTORY



system has given us a competitive advantage."

Das says that Western Union Corp. and other bank messaging competitors have already started working on their own versions of expert systems. "But by the time they're on-line, we'll have established our edge," he boasts.

#### No more paper route

The MCI system will eventually classify messages into 35 types and automatically route them to the appropriate bank department, Das claims. The company also plans to introduce a personal computer-based extension that will reside with the customer, allowing a bank to do some local automatic message sorting and routing. The module will communicate with both the MCI system and the bank's own systems.

Some observers believe that the most promising application for expert systems is as front ends to conventional applications. "The real advances in computers in the 1990s



**REID KAPLAN**, a senior applications specialist at Yale, says that adding intelligence to old systems is like giving them a "midlife kicker." And Yale's personnel/payroll system just got that kick.

will be to make them usable," asserts Cambridge Technology Group's Donovan. "Today, you can't just walk up to an order-entry system and start using it. Expert systems can provide the interface that makes that possible — if you can make expert systems work with the existing systems." Donovan offers as an example a physician's workstation system to which Cambridge Technology recently added a voice recognition and image processing interface. The interface allows a doctor to retrieve information on patients — including patient photographs — and order tests with little or no training on the system.

Yale University's IS department has embraced the concept of expert system-aided ease of use. Yale's IS department, which annually enters some 50,000 forms relating to payroll alone, added an expert system front end to ease the burden on both the people who enter the data and the people who want to access the data.

"We have a giant, integrated

## 3287 Desktop Printing From Your Mainframe

### ...With LaserJet Power

Now you can create great looking LaserJet documents directly from your mainframe with the **NEWPORT/Coax** printer adapter. Merge on-line text, graphics, fonts and letterhead to give your reports and printouts the professional appearance they deserve.

**NEWPORT** fits right into the optional I/O slot in the LaserJet II or IID printer. Simply attach a standard 3270 Type A coax and press the "Optional I/O" button. You're ready to print directly from your mainframe. The serial and parallel ports of the printer are left available for connection to personal computers and other devices.

**NEWPORT** was co-developed with Hewlett-Packard to ensure maximum compatibility. In addition to 3287 emulation, the **NEWPORT**/LaserJet combination gives you features you can't get from a 3287 printer.

**NEWPORT** is completely host configurable and compatible with your IBM supplied host software. Graphics are available through GDDM, user-developed programs, and a variety of third party host application software including TELLAGRAF, MD-LASER, MD-GRAFTEXT and SAS/Graph.



**For Your Evaluation Unit  
Call 1-800-633-9299**

During Business Hours, 8-5 CST

Andrew will provide a **NEWPORT** to qualified buyers for a 30 day evaluation. At the end of the evaluation period, you may purchase the **NEWPORT** for \$895, or return the unit at no charge.

**NEWPORT** was designed and manufactured by Local Data. With more than a decade of experience with IBM interfaces and protocols, Local Data is now an Andrew Company dedicated to providing leading edge communications technology.



**ANDREW  
Network Products**

Midwest Operations Center, CWF-NEWPORT  
4650 N. Fort Washington Rd., Milwaukee, WI 53212  
© 1989 Andrew Corporation 0191-8906  
LaserJet is a registered trademark of Hewlett-Packard Co.

## AT THE CROSSROADS

**THERE ARE TWO** basic approaches to integrating expert systems. One is to use an expert system development environment that has been specifically designed to run on a mainframe. IBM, Cullinet Software, Inc., Aion and AI Corp. all offer products that run alongside mainframe applications. The other approach is to establish a gateway between a dedicated expert systems application and a conventional application. Symbolics is one company that follows the gateway route.



The mainframe approach has obvious appeal to IS departments, which typically cast a suspicious eye on any application that requires a specialized operating environment. "Expert systems should be fielded on the same platform as the platforms that traditional applications are running on," insists John Landry, Cullinet executive vice-president of development. Landry claims that the mainframe approach is particularly well-suited to transaction processing applications such as order entry and cost accounting systems.

Harry Reinstein, Aion president and CEO, identifies three types of integration an expert system should provide with conventional applications. The first is the ability for the expert system to access and update data associated with the conventional application; the second is the ability for the conventional application to automatically call the expert system module as a subprogram; and the third is the ability for the expert system to call parts of the conventional application as a subprogram.

Though not all customers use all three types of integration in every application, Reinstein notes, any one type can be crucial to a particular application. Thus, Lincoln National Insurance used Aion's development environment to build a primarily expert system-based risk management system that calls on parts of conventional applications, while Pacific Bell used the environment to add expert systems modules to a primarily conventional network design application.

### A \$27 million savings

The gateway approach can have advantages as well. Complex, high-transaction volume expert systems applications tend to run inefficiently on conventional computers because of the unique programming structure of expert system rules. Thus, American Express Co. turned to dedicated Symbolics processors that communicate with conventional mainframes to build and run its credit card transaction approval system. Amex estimates that the system, which examines a customer's spending trends before approving a purchase, saved it \$27 million in 1988.

Cambridge Technology Group has reportedly developed a generic gateway technology that allows it to integrate an expert system — or virtually any computer technology, for that matter — with any conventional application, regardless of the environment. Expert systems integrated by Cambridge are running a telemarketing system at Maryland National Bank and a commodities trading system at a major food processor, according to Cambridge Chairman John Donovan.

Whichever approach is taken, the task of integrating expert systems will almost certainly become easier as vendors work to make their interfaces more and more seamless.

personnel, payroll, benefits and pension system that has been very difficult to get information into on a paper basis," explains Reid Kaplan, a senior applications specialist at Yale. To make it more complicated, this human resource system is linked to other Yale applications, ranging from the university's general ledger system to its parking control system. As a result, Kaplan says, the process of entering all the data the system needs in exactly the right format has been "expensive and full of grief."

Yale's expert system front end, built with a mainframe-based development environment from Palo Alto, Calif.-based Aion Corp., tremendously simplifies data entry, he says. Whereas the system once asked a full range of detailed questions on each person entered into the system, it now filters out irrelevant questions and ones to which it already has answers. Thus, it won't ask for the union status of an employee that is a manager, nor will it ask if a 30-year-old professor is retired.

Kaplan contends that such expert systems modules are the only alternative to scrapping organizations' huge investment in existing hard-to-change applications. "Users have invested a lot of time in learning how to access the information. That makes it difficult for MIS to change the database — unless we make it easier to use. By adding intelligence, we're getting a midlife kicker for old-line systems," he says.

One area not yet widely addressed by expert systems is that of the core processing of large commercial applications. "Deeply embedded expert systems programs will be a growing area of importance," Cigna's Schelm explains, "but it hasn't been explored to a great extent." There is ample incentive for exploration, however: An expert systems program is typically 10 times as inexpensive to build and maintain as a functionally similar conventional Cobol program, according to Aion President and Chief Executive Officer Harry Reinstein.

As the trend to bring expert systems into mainstream IS continues, it will become harder — and potentially costlier — for IS managers to ignore the technology. ♦

# Why Treat The Symptoms Of Network And Systems Pains When You Can Have The Cure?



## Losing sleep over Computer Operations nightmares?

The SYS/MASTER™ component of NET/MASTER™ gives you the automation you've only dreamed about. SYS/MASTER automates complex operations tasks and resolution of problems (even at remote sites).

## Tired of the bandage approach to Network Management?

The NET/MASTER Advanced Network Management component lets you take control of your network by automating the resolution of complex problems you're faced with daily. No matter what multi-vendor strategy or what architecture you choose, NET/MASTER is the place to start.



## Looking for relief from Help Desk headaches?

Give your Help Desk the serious tools they need to automate problem, change and configuration management tasks. NET/MASTER makes manual tasks a thing of the past.



## Feeling uneasy about Network Access and Security?

NET/MASTER gives you easy and secure network access for automated management of your network. Authorized users can utilize as many applications as they like—eliminating multiple terminals and long log-on procedures.



## Finding it hard to stomach the usual File Transfer problems?

Transfer commercial volumes faster and more reliably than other software products or courier services. Automate the complete process of transferring and using data with the worry-free NET/MASTER File Transfer component.

# Get NET/MASTER. It's Serious Medicine.

Only NET/MASTER from Cincom® provides serious, permanent solutions with a comprehensive, fully integrated system of components: with easy installation and fast-acting implementation that gets right to the source of all your problems.

NET/MASTER lets you automate and manage your network and systems with greater control, efficiency and reliability than any product on the market today. And NET/MASTER gives you functionality and flexibility that

unmatched, single-solution products just can't provide.

Join over 700 organizations who have found permanent relief with NET/MASTER. To find out more, call us today, toll-free, at:

**1-800-543-3010**

In Ohio, 513-661-6000 • In Canada, 1-800-387-5914

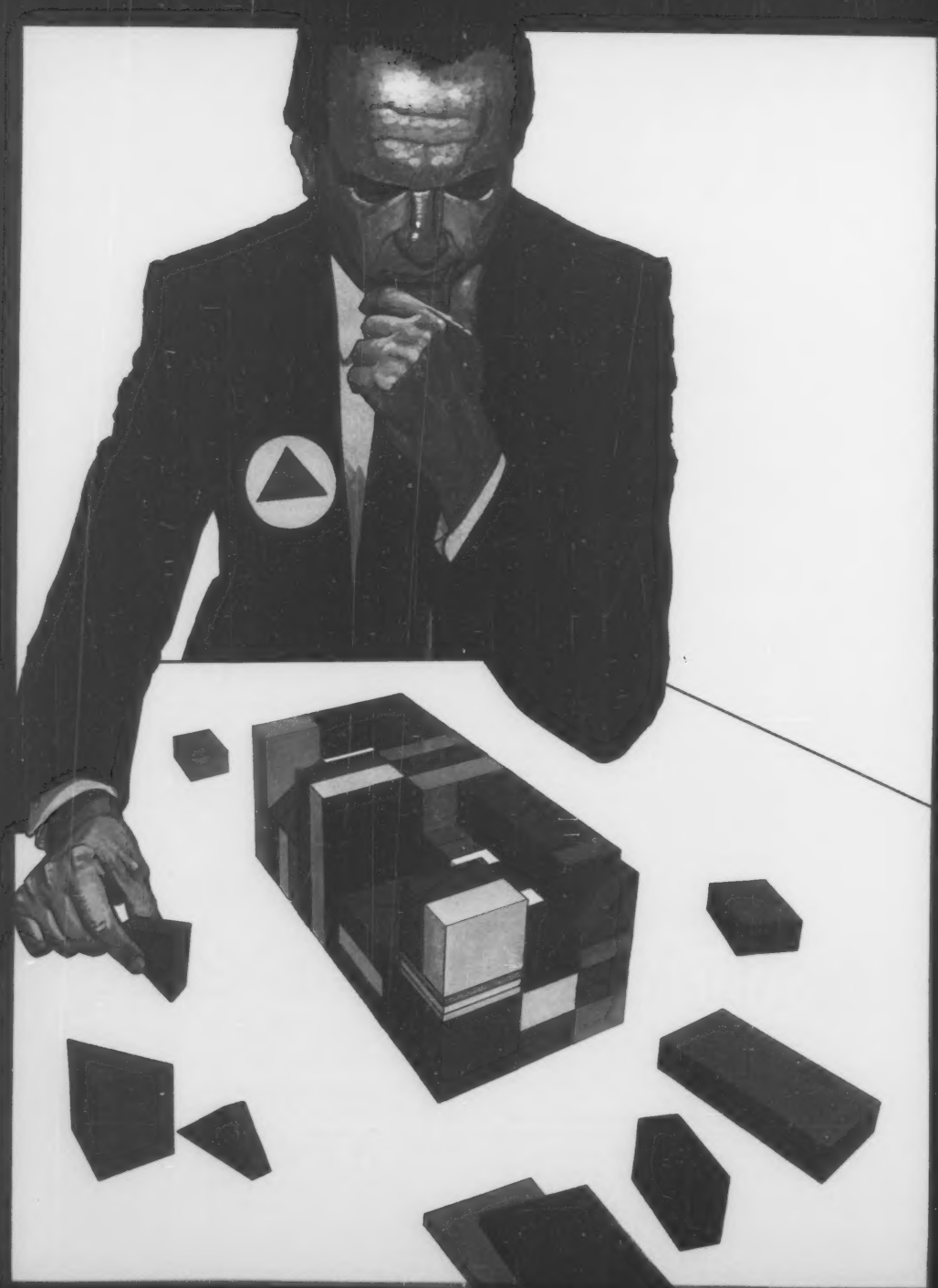
**CINCOM**  
The Better The Solution, The Better The Value™

International Regional Headquarters: Maidenhead, UK (0628) 72731 • Paris (1) 45456779  
Frankfurt (69) 719070 • Tokyo (03) 438-2791

Circle Reader Service Number 15

© 1988 Cincom Systems, Inc.





Are systems integration  
firms offering the best  
solutions or just pushing  
their own products?

# A QUESTION OF bias

BY STAN KOLODZIEJ

**N**OT ALL CONFLICT of interest issues are coming out of Washington, D.C., these days. Some information systems professionals are calling into question the integrity of the systems vendors with which they are conducting their integration business. Such doubt centers on the ability of systems vendors to offer corporate users the best solutions, without product bias.

How are IS professionals coping with the dilemma they find themselves in?

"I believe that many large companies like ourselves have reached a crucial stage in their IS development," maintains Gopi Balija, director of strategic systems development at Ogilvy & Mather, an advertising firm in New York. "Integration is important because it's not just putting hardware and software together, it's part of a larger look at where IS is going — to multimedia environments, what I would even call hypermedia environments.

"The IS manager has to pull all of this together from several sources. If he relies on one or two suppliers, he will fall short," Balija says.

The vice-president of information management at a large Northeastern bank says that any integrator must

first have a strategic fit with the bank's architectural framework and must also be open to third-party vendor equipment. Citing more control over integration installations, the bank vice-president says he would prefer, if possible, to stay with a systems vendor to supply most parts of an integration plan; however, he also adds that that policy is never written in stone.

"One time recently we rejected one of IBM's arguments that its mainframes could handle heavy [data] throughput and went instead to Arthur D. Little to configure a hardware and software solution," the VP says. "At the same time, we let NCR handle a bank automation system using its own integration plan and components. In one case, we went outside to a professional services firm; in the other, we stayed with a sys-

tems vendor to supply everything."

Balija says that IS should be wary of vendors promoting their own systems over better solutions that can be found and melded.

And he is not alone in his thinking. A recent study involving several New York-based Fortune 100 firms produced some interesting findings.

The members of the study, conducted by the Ledgeway Group, Inc., a Lexington, Mass.-based research organization, agreed that most hardware or systems vendors approach professional services projects with a product bias. No mystery. However, the study participants said that because of such product prejudice, they were reluctant to use systems vendors for integration design proposals, feeling such bias would limit the design's scope. For actual implementation proposals, however, the study

participants were very keen on using systems vendors because the vendors would be the most knowledgeable and skilled in installing their own products.

There's more: Study members also saw demand for outside professional services growing in their IS facilities as information systems become more complex, as end-user needs become more complicated and as in-house staff becomes more limited.

The downside, however, is that the respondents to the study said they felt systems vendors lacked the product knowledge and skills to cope in multivendor environments, which is the bread and butter of systems integration work.

As would be expected, systems vendors bristle at such findings. David Creed, corporate marketing manager for

### CRITERIA FOR SELECTING SERVICES FIRMS

- Proven track record.
- Technical expertise.
- Project management expertise.
- Multivendor integration skills.

Information provided by the Ledgerway Group

Creed says. "We commonly deal with multivendor environments. . . . That's the way the industry has changed.

"I don't think any [systems] vendor is going to give any customer 100% saintly objectivity. We have products that we want to sell, and so do many others. What the customers watch is the bottom line, and I don't think they care where they get that help from, product bias or not," he explains.

That's true for George Timchal, technical specialist at Scott Paper Co. in Philadelphia. Timchal is pondering how his company can integrate the IS functions of two

"If IS  
relies on  
one or  
two ven-  
dors, it  
will fall  
short."

Gopi Balija,  
Ogilvy &  
Mather



systems integration and professional services at Digital Equipment Corp., wants to set the record straight.

"Our programs rarely, if ever, include 100% Digital products,"



Scott Paper's  
Timchal  
is wrestling  
with multivendor  
integration.

recently purchased companies to form a third business unit. The project will involve integrating multivendor environments.

What Timchal wants is a conceptual vision of where the new business unit's information systems should go, not just the usual data on the physical linking of software and computer equipment. To that end, Scott Paper has approached four companies, including two systems vendors, a telecommunications company and a consulting group, and has asked them to supply that vision. The company hopes to decide on one of them soon.

DEC's systems integration strategy, as well as that of other systems vendors, is in large part aimed at securing existing installations and retaining account control. New systems integration business, however, is also going to hinge on capturing the design and implementation phases of the business.

### Filling in the blanks

Systems vendors have been acting to fill in the blanks in their strategies. Many have chosen to buy independent professional services firms to gain credibility among integration customers. Nynex Corp. is a good example of this trend: During the past few years, the telecommunications provider has acquired AGS Computers Ltd., a software services company; BIS Ltd., a British consulting firm; Telco Research, a telecommunications management company; and Data Group, a field service management systems vendor.

By its very nature, systems integration tends to be less hardware-driven. Instead, it places a much greater emphasis on software and other value added such as service and maintenance facilities, explains Clare Fleig, director of research at International Technology Group, a Los Altos, Calif., research firm.

Ironically, however, if systems vendors have a weak spot, it's in providing leading-edge software solutions. In that increasingly crucial area, professional services firms

## YES! I Want to Integrate my Applications

- ☐ Please send me more information on TPX
- ☐ I'm interested in a FREE 30-day trial of TPX. Please have an account representative contact me.
- ☐ I'm interested in additional products to improve the productivity of my network. Please send me more information on the following:
- ☐ STX (SNA-to-X.25)
  - ☐ NetSpy™ (for MVS or VM, circle one)

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Operating System(s) \_\_\_\_\_ No. of CPUs \_\_\_\_\_

VTAM Release \_\_\_\_\_

CW040389F





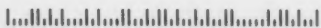
NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 13340 PITTSBURGH, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Duquesne Systems Inc.  
Two Allegheny Center  
Pittsburgh, PA 15212



such as Andersen Consulting, Arthur Young & Co., Price Waterhouse, Software Design Associates and Arthur D. Little have been eating systems vendors lunches.

The perception of product bias and software weakness might prove a difficult combination to overcome for systems vendors.

#### Strong follow-up

If systems vendors are stumbling at the design and software front ends, however, they could make up for this potential impasse at the back end of integration: service and maintenance, two areas that are carrying a heavier weight in IS departments.

These areas are good avenues for systems vendors to gain new integration business as well as maintain account control.

IBM, DEC, Hewlett-Packard Co. and other systems vendors are offering blanket service and maintenance coverage for their own products as well as other vendors' equipment and software.

IBM is a good example of how vendors are working to dispel the perception of product bias. The company has been aggressively promoting its networking service plan through which IBM becomes the focal point in servicing its clients' networks, whether those networks belong to

### DIFFERENCES IN INTEGRATION PROJECTS ADDRESSED BY IN-HOUSE STAFF VS. PROFESSIONAL INTEGRATION FIRMS

#### IN-HOUSE PROJECTS

- Short term, usually lasting six to nine months.
- Simple, requiring minimal custom programming or configuration.
- PC based.
- Unique, giving proprietary or competitive value.
- Mandated by corporate.

#### OUTSIDE PROJECTS

- Long term, usually lasting over nine months.
- Complex, involving multivendor integration and extensive custom programming.
- Minicomputer and mainframe based.
- Low visibility and impact.
- Politically sensitive.

Information provided by the Ledgeway Group

IBM or not.

According to a spokesman, the company recently purchased Spectrum Services, a division of Pacific Telesis. Spectrum has provided the technology for network probes, or monitoring software, which IBM operates from five service centers in the U.S. Such probes, IBM claims, can detect problems in multivendor networks before they happen.

#### In-house talent

But not all large companies are concerned with product biases fostered by some systems vendors and professional services. They are lucky enough to have skilled staff in-house to make integration decisions that are best for them.

James F. Sutter, vice-president & general manager of Rockwell Information Systems at Rockwell International Corp. in Seal Beach, Calif., has approximately 3,000 people working in software and applications development. The company has created a Software Engineering Center to evaluate incoming software and is actively involved in computer-aided software engineering and artificial intelligence research.

As Sutter understates: "I think we can say that we've had a very small dependence on third parties for systems integration." ♦



**"I think we can say that we've had a very small dependence on third parties for systems integration."**

**James F. Sutter,  
Rockwell International**

# WHY NETWORKS fail

Protect  
your net-  
work proj-  
ect from  
the forces  
out to  
ruin it.

BY AVERY JENKINS

**G**O AHEAD. SLEEP TIGHT thinking all's right with your network. Don't think about the political mine field that is threatening to blow between the IS department and users who want data access. Don't think about the hidden costs that may crop up after your networking budget has been OK'd. And certainly don't think about whether your network is vulnerable to attack from those insidious little viruses we've all heard so much about.

Don't think about these possibilities, and you may be writing off your company's network investment.

Not everybody realizes the importance of their networking systems at first, as Pat McGuffie, manager of business communications and network planning at Champion International Corp. in Hamilton, Ohio, discovered.

McGuffie manages both the voice and data networks for Champion, a paper manufacturer with plants in several geographically dispersed locations.

JENKINS is a free-lance technology writer based in the Boston area.

McGuffie says that politics created networking problems for him in part by inhibiting his ability to prepare for the future. In previous years, McGuffie says, he has had to fight for the funds he needed to keep his operations apace with existing user demands.

Because of Champion's previously tightfisted budget policies, McGuffie was not able to expand the company's network enough to meet projected demand. Three years ago, upper management "didn't give us the money to do those things," he says.

Those policies have left

McGuffie in a position of playing catch-up as usage has increased. But because communications has, in his words, become "a high-ticket item," he has been given a larger budget to meet the ever-increasing demands.

But as many before McGuffie have discovered, fame brings its own set of problems.

Champion's data network "has become so increasingly important that it has become a 'jewel'" that many want to control, McGuffie says. Turf wars have erupted between various interest groups.

For example, McGuffie



*IRV BLYTHE, keeper of Virginia Tech's campuswide network, advises IS managers to be very specific in stating network needs.*



says, in some cases, IS computer analysts have attempted to establish their own communications links for some new applications rather than relying on the existing network that they consider outside their control.

Bill Yundt, director of networking systems at Stanford University in California, has also seen the political infighting that sometimes accompanies networked systems. According

to the more specific the plans are, the less likely managers are going to encounter hidden costs.

Virginia Tech is in the middle of a five-year project to wire the entire campus with data, video and voice networks.

Blythe says that before any work began, the university's task group outlined its requirements very specifically. The school also studied other large-network installations, both successful and unsuccessful.

"In most of the cases where the projects be-

came disasters, we found... they were places that didn't know what they wanted," Blythe says.

Even if network capacity is correctly projected, however, managers frequently underestimate the costs of the personnel required to implement, maintain and administer the system.

According to Algis Leveckis, a managing associate at the Index Group, up to 50% of the five-year operating costs of a network goes to personnel, while only one-third of those costs comes from acquiring the network.

For example, by the end of 1988, Virginia Tech's widespread campus was equipped with approximately 6,000 integrated voice/data connections, according to Blythe. As the project got under way, Blythe saw his staff grow almost exponentially.

By last summer, the networking staff grew to an all-time high of 230 people, Blythe says. Fortunately, after the physical installation was complete, that number dropped to 90, which is the level Blythe expects to maintain.

Part of the reason for the explosive growth, he explains, was because the university chose to lay all of its own cable, which includes fiber-optic, coaxial and twisted-pair media. This turned out to be the only way in which Blythe could ensure the quality of installation he required.

At Virginia Tech, Blythe was prepared for the explosive growth in personnel. But even a well-specified network plan and a good grasp of the people required to run it cannot prevent communications professionals from encountering hidden costs that are out of their control.

Like Champion's McGuffie, Tim Taylor, who is manager of network services at Compass Computer Services in Carrollton, Texas, is facing a steady increase in the traffic on his network.

Compass operates the nationwide reservation network for companies such as Hilton Hotels and Budget Rent-A-Car, the car rental agency. The network is a point-multipoint setup, Taylor says, with most traffic being one-way from a central location. With such a geographically widespread network, Taylor is very dependent on telephone lines — a dependency he is now fighting because of increasing tariffs.

"The uncontrollable cost is in expensive, terrestrial multipoint circuits," Taylor says. "Several times a year, [tariffs] can change."

One of the options Taylor faces is not to expand the network and allow response time to degrade. But the companies that use Compass' services depend on a rapid response time, and when the system slows down, "sometimes they get pretty upset," he says.

Taylor's long-term solution is to get control over his wide-area transmissions by moving from a terrestrial network to a satellite-based very

#### REASON #1: POLITICAL INFIGHTING

Turf wars can get in the way of network success as various interest groups fight to gain network control.

to Yundt, data networking got its start at many companies at the PC level technologically and the department level organizationally. With the growth in importance of networks and departments' need to interconnect, the fight for network control began.

McGuffie says he is fortunate in that the responsibility for telecommunications and data communications has always rested within the IS organization. The rivalries are occurring only within the MIS department itself, he says, keeping the network wars on an intramural level.

At many companies, though, the telecom department often reports to the chief information officer or financial arm of the company rather than to the IS department. As a result, fierce political battles are waged as IS, seeing itself becoming dependent on telecom networks, fights to gain control over that function.

#### Where'd that come from?

But politics isn't the only obstacle to networking success. Networks can contain hidden costs that companies should plan for, both users and consultants agree.

According to Bob Dantowitz, a principal of the Index Group, Inc., a research company in Cambridge, Mass., hidden costs can crop up because of poor capacity planning.

Irv Blythe, director of communication network services at Virginia Polytechnic Institute and State University in Blacksburg, Va., agrees

#### REASON #2: HIDDEN COSTS

Poor capacity planning and changing telecom tariffs can defeat a network project before it gets off the ground.

small aperture terminal transmission system. He says that substantial transponder space is already available, which has made satellite transmission relatively inexpensive. And with the NASA space shuttle program back in operation, the launch of additional satellites will ensure continued low costs, he explains.

Another way in which networks

can go wrong is lax security. The recent spate of viruses, including the much-publicized one that infected Arpanet and other networks, as well as the increase of hacker invasions have made many companies concerned about the security of the information going across the corporate data channels.

In addition, the accusing finger has been pointed in many cases at the networks themselves as the weak link in the security chain, which leaves IS network managers in a bind.

Networks, Leveckis says, are increasingly being used to provide communications outside of the organization. However, at the same time that networks need more open access, they also require increased security.

At Virginia Tech, Blythe operates an open network that does not contain built-in security. Instead, he says, each computing site is responsible for developing and maintaining its own security.

McGuffie's approach to security

at Champion is somewhat different. "Our network is fairly secure. It is self-contained," he says, explaining that the only direct dial-up ports from the outside are through a value-added network. But even that has its own security.

In spite of the recent reports of hackers and viruses, many information systems executives and consultants don't see a need to beef up network security.

In fact, according to the Index Group's Dantowitz, the concept of network security is often seen as a contradiction in terms.

"The network is there to help people get in," Dantowitz says. Managers can't think of security "in the sense that they want to keep people out."

And several IS professionals claim that the reason the recent Arpanet virus was quelled so rapidly was that

investigators were able to trade information quickly over the very same network that spread the virus in the first place.

A more important problem, according to Dantowitz, McGuffie and several others, is that of disaster recovery and reliability. These are more likely to be points of drastic

### REASON #3: LAX SECURITY

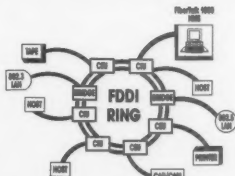
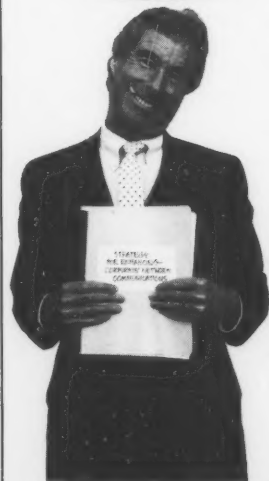
"It can't happen to me" is one reason to go without network security — until your network crashes.

network failure than security problems, they say.

But these problems require that network managers go outside of their own organization and to the IS department and user groups to ensure that proper procedures are developed and followed.

In other words, McGuffie says, "the solution to communications problems is communication." ♦

## How to make Metropolitan Area Networking a familiar ring around the office, and make you a hero.



By letting IN-NET's FiberTalk products put your present networking technology into the next generation of communications.

IN-NET products offer complete integration of VOICE, DATA, VIDEO and IMAGE transmission. Increased connectivity, reduced long term installation cost, multiple or single site installation, connectivity to public or private networks and speeds of 34/45 Mbps or 100 Mbps. All operating on fiber.

### IN-NET's existing and upcoming family of products include:

- **Channel Products** that provide connectivity between geographically isolated IBM mainframes and plug compatibles via a 100 Mbps FDDI fiber network.
- **Backbone Network Products** provide a bandwidth of 34/45 Mbps.
- **Network Extension Products** provide connectivity between the FDDI and the 34/45 Mbps networks.
- **The Network Manager** is a PC operating system that provides centralized management for maintaining, controlling and supervising the network.

For more information on how you become a hero and enhance your corporate network communications, simply give us a ring.



16720 West Bernardo Dr./San Diego, CA 92127-1904/(800) 283-FDDI/(619) 487-3693/FAX (619) 487-3697

Circle Reader Service Number 16

Computerworld Focus on Integration 53

# caseing

## THE JOINT

BY STAN KOLODZIEJ

**I**N 1984, WHEN Pat Guidash first brought a computer-aided software engineering system into his company, he says the shock waves could be felt all the way to upper level management.

"I had given my [CASE] expectations to management and my staff," explains Guidash, who is director of systems development at Wilmington, Del.-based Hercules, Inc., a supplier of parts to the aerospace and automotive industries, "but we were overly optimistic. Our learning curve turned out to be a lot longer than we thought."

CASE didn't make an easy first ride for Ed Lipson, either. The New York Bank assistant vice-president of the IS planning division and his colleagues were told in 1984 that a CASE tool would be introduced as a code generator that would cause little disruption to the development of banking applications.

"Instead, we got culture shock," Lipson says. "We tried shoehorning the old data design into the CASE format. We weren't prepared for it [CASE]."

Not many companies are prepared for CASE. And they need to be because CASE is playing a crucial part in companies whose resources are becoming increasingly connected.

Because such CASE systems are being integrated into user applications, there is more pressure from users to run CASE across numerous hardware and software platforms as well as networks.

At the same time, CASE vendors are adding greater

numbers of tools to their CASE arsenals, producing cradle-to-grave systems that can take customers through complete series of application life cycles and even back through the reengineering of existing programs. To leverage future sales to installed bases and establish account control, CASE vendors are pushing these bigger, more complete systems at customers, promoting one-stop CASE shopping.

The bigger the CASE systems become, the greater will be the difficulty in integrating them into the traditional setup of the MIS shops.

Under these conditions, preparing for CASE is essential.

Barbara Bouldin, author of *Agents of Change*, a book researching the impact of new technology on organizations, advises corporations against moving too quickly into computer-aided software engineering and causing major disruptions in IS.

She points to her own experience with CASE as a systems analyst for AT&T.

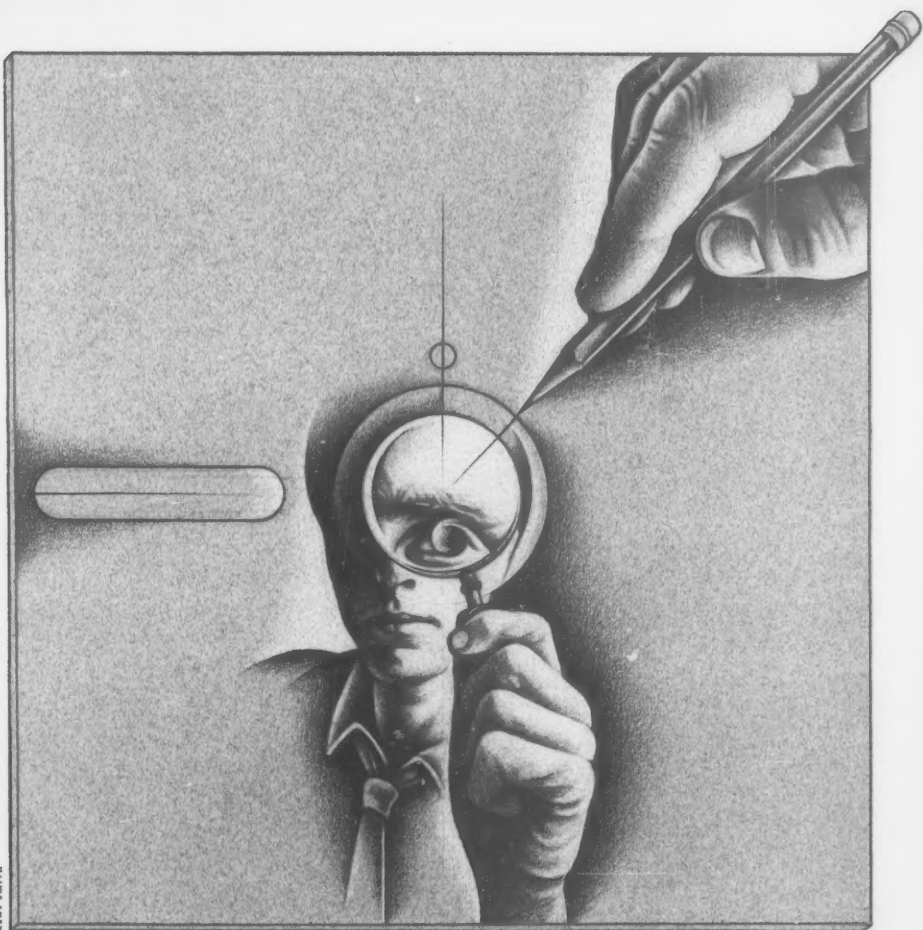
"We knew it would be more beneficial to take the extra time and make the [CASE] tool fit our existing methods than the other way around," Bouldin says.

That also applies to people.

"Users are comfortable in their positions," she explains, "but I've seen so many situations where the first thing companies do when introducing new technology is initiate changes" that directly affect the way people do their jobs.

And don't expect much help from CASE vendors when it comes to integrating CASE in the corporate environment, Bouldin says.

"There is pressure from users for [CASE] vendors to supply more than just tools, but any consulting that vendors offer will deal with technical areas like structured methodologies," Bouldin explains.



"The agents of real environmental change have to be created from within the corporation."

Suzanne Niedzielska, CASE project manager at the Travelers Cos. insurance firm in Hartford, Conn.,

agrees. "I think buyers' expectations of CASE are in some cases unrealistic," she says. "The technology cannot yet deliver a solution that fits every systems project team or application."

In the meantime, Niedzielska maintains that a large company without an entrenched development or maintenance methodology, which CASE can automate, is in for

a long haul. "Without such methodology, the management direction and support and the [programming] cultural change required with CASE are going to be a more substantial investment," Niedzielska says.

**Laying the groundwork for CASE may help make its acceptance easier.**

Vendors are trying to provide more than just tools. Melvyn Bergstein, managing partner of technical competence at Andersen Consulting in Chicago,

says CASE is not just about design intent but must also be integrated into the shape of the client's business.

"But I agree that there is a lot of work to be done," Bergstein says, concurring with Bouldin's assertion that



the onus is on IS departments to get themselves ready for the changes that CASE will bring.

In the meantime, Bergstein says, CASE users need to see the fundamental change in perception that CASE entails, which is to emphasize data administration. "MIS will assume different roles," Bergstein explains. "They will become keepers and administrators of the [systems] architecture. The days of that tough MIS attitude that only real men write their own code are fading."

There might be some imminent changes in the CASE arena, however, that could better instruct MIS in how to lay the groundwork for CASE.

More CASE vendors are looking toward the concept of the Integrated Project Support Environment (IPSE). IPSE emphasizes the integration of CASE tools and puts a premium on team approaches to software development and methodologies, something that the Europeans and Japanese have been promoting

**NEW YORK BANK'S ED LIPSON** says lack of preparation for implementing CASE meant the bank got culture shock rather than code generation.



JOHN CHASSON/BARMA LIAISON

## LAYING THE CASE GROUNDWORK

**BARBARA BOULDIN**, author of *Agents Of Change*, gives the following advice to lay the groundwork for computer-aided software engineering:

- Assess the need for CASE. Many companies bring in new technologies without a firm understanding of the

corporation's needs for that technology.

- Evaluate the computer-aided software engineering product carefully, possibly in a pilot project, before it is formally integrated.
- Present the product to upper level management and show what it can do. Bouldin says senior management has come full circle on CASE in the '80s, going from skeptical to overly enthusiastic and back to skeptical. Showing is believing.
- Present the product to users and show how they will derive direct benefits from CASE. Afterward, go back and canvass users on their thoughts and ideas for improvements on CASE policy.
- Look for potential agents of change. CASE doesn't always have to involve just IS staff, Bouldin maintains. Valuable CASE support can come from other personnel, including users and senior management.
- Plan how CASE should be introduced to the corporation. At this stage, according to Bouldin, IS should have the representation and understanding of people from those areas of the company that will be affected by CASE.
- Introduce CASE quickly but incrementally once the skids have been greased, so to speak. CASE should be aimed at software projects that will have a direct impact on user/programmer productivity. Quick, hard results will establish long-term corporate support for CASE.



JOSIPA BIRER

**BARBARA BOULDIN** says agents of change can be found in unexpected places — among users and senior management.



**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business

Basic Rate: \$48 per year

\*U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E49CF-3



**YES,** I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39\* per year — a savings of 62% off the single copy price. In addition, I'll receive special bonus sections of **COMPUTERWORLD** Focus on Integration.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_  
 Title \_\_\_\_\_ Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown: ☐ Home ☐ Business

Basic Rate: \$48 per year

\*U.S. Only, Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

# COMPUTERWORLD

E49CF-3

- 1. BUSINESS/INDUSTRY** (Circle one)
18. Manufacturer (other than computer)
  19. Finance/Insurance/Real Estate
  20. Medicine/Law/Education
  40. Wholesale/Retail Trade
  50. Business Service (except DP)
  60. Government — State/Federal/Local
  65. Communications Systems/Public Utilities/Transportation
  70. Mining/Construction/Petroleum/Raffining/Agric.
  75. Manufacturer of Computers, Computer-Related Systems or Peripherals
  85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
  90. Computer/Peripheral Dealer/Distributor/Retailer
  95. User, Other
  99. Vendor, Other \_\_\_\_\_ (Please specify)

- 2. TITLE/FUNCTION** (Circle one)
- 15. MIS/DP MANAGEMENT**
18. Vice President, Asst. VP
  21. Dir., Mgr., Suprv. IS/MIS/DP Services
  22. Dir., Mgr., Suprv. of Operations, Planning, Adm. Services
  23. Dir., Mgr., Suprv. Analyst of Systems
  31. Dir., Mgr., Suprv. of Programming
  32. Programmer, Methods Analyst
  35. Dir., Mgr., Suprv. O&WP
  38. Data Comm. Network/Systems Mgt.

- OTHER COMPANY MANAGEMENT**
11. President, Owner/Partner, General Mgr.
  12. Vice President/Asst. VP
  13. Treasurer, Controller, Financial Officer
  41. Engineering, Scientific, R&D, Tech. Mgt.
  51. Sales/Mktg. Mgt.

- OTHER PROFESSIONALS**
60. Consulting Mgt.
  70. Medical, Legal, Accounting Mgt.
  80. Educators, Journalists, Librarians, Students
  90. Others \_\_\_\_\_ (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
- A. Mainframes/Supertimes
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems
  - F. No Computer Involvement

- 1. BUSINESS/INDUSTRY** (Circle one)
18. Manufacturer (other than computer)
  19. Finance/Insurance/Real Estate
  20. Medicine/Law/Education
  40. Wholesale/Retail Trade
  50. Business Service (except DP)
  60. Government — State/Federal/Local
  65. Communications Systems/Public Utilities/Transportation
  70. Mining/Construction/Petroleum/Raffining/Agric.
  75. Manufacturer of Computers, Computer-Related Systems or Peripherals
  85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
  90. Computer/Peripheral Dealer/Distributor/Retailer
  95. User, Other
  99. Vendor, Other \_\_\_\_\_ (Please specify)

- 2. TITLE/FUNCTION** (Circle one)
- 15. MIS/DP MANAGEMENT**
18. Vice President, Asst. VP
  21. Dir., Mgr., Suprv. IS/MIS/DP Services
  22. Dir., Mgr., Suprv. of Operations, Planning, Adm. Services
  23. Dir., Mgr., Suprv. Analyst of Systems
  31. Dir., Mgr., Suprv. of Programming
  32. Programmer, Methods Analyst
  35. Dir., Mgr., Suprv. O&WP
  38. Data Comm. Network/Systems Mgt.

- OTHER COMPANY MANAGEMENT**
11. President, Owner/Partner, General Mgr.
  12. Vice President/Asst. VP
  13. Treasurer, Controller, Financial Officer
  41. Engineering, Scientific, R&D, Tech. Mgt.
  51. Sales/Mktg. Mgt.

- OTHER PROFESSIONALS**
60. Consulting Mgt.
  70. Medical, Legal, Accounting Mgt.
  80. Educators, Journalists, Librarians, Students
  90. Others \_\_\_\_\_ (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
- A. Mainframes/Supertimes
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems
  - F. No Computer Involvement



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



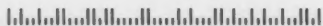
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



# TPX<sup>®</sup> Application Integration Made Easy

Consolidated Customer Information/History System

Account Type: Pay-by-Phone  
Customer Name: Steven H. Crilley  
Address: 811 Main Street  
Pittsburgh, PA 15212  
Account Number: 744-7115-2334

Date      Amount      Number      Description

12-11-88	15.00	100	Trans. with City of
12-05-88	121.64	101	Alb. & Bus. Exp.
12-04-88	225.99	102	Exp. Stamps

Enter last account number

## TPX Version 2.0—the New Standard in Session Management

Session managers allow users to switch among applications, but what happens when information is needed from two or more applications at the same time? TPX, the world's leading session manager, now sets a new standard for session management by providing Application Integration—easily.

### Users Need Application Integration

Many times every day your users need to access and update information from multiple applications concurrently. For instance, a service representative using a Customer Information application under IMS sees a customer's name, address and a summary of accounts. While viewing this data, the service representative needs to access detailed information from the Account History application running under CICS. Think of the increased efficiency and improvement in customer service if information from two or more related applications could be combined on a single, interactive screen.

## TPX Provides the Solution

TPX makes it easy to front-end your existing applications with your own customized screens. You can integrate transactions and data from any number of applications, giving your users a unified, standard view regardless of the format of underlying application screens.

### TPX Does Windows Too

You can also integrate concurrent applications with TPX Windows, a powerful, full-function windowing facility. Either way, you will increase your users' productivity and your business' competitive advantage.

### Discover the Benefits for Yourself

Return the attached reply card today for more information on how TPX 2.0 can help you integrate your applications in an MVS or VM environment or feel free to call (412) 323-2600 ext. 444 in PA.



**DUQUESNE  
SYSTEMS**

Two Allegheny Center  
Pittsburgh, PA 15212



for years. U.S. vendors' strengths, on the other hand, have traditionally been in individual CASE tools and not in the project management capabilities that IPSE embodies.

The coupling of IPSE with advanced CASE tools will make the introduction of CASE technology less disruptive to organizations.

But in the meantime, the burden is on IS staff to ease the transition to CASE. Both Lipson and Guidash, for example, say that despite their rough starts, their CASE work has grown very productive over the years.

There is inevitably some price to pay up front when you introduce CASE, Guidash claims, but it's a necessary price. In the end, it's better to have some CASE than none at all.

"My vision for CASE is a vehicle where I can sit down with a user and go over the conceptual design and analysis of a program, then have the code come out the back, without any need to wring it out with fourth-generation languages or anything else," Guidash says. "There'd be no inter-

ruption from prototype to code."

Maybe IPSE will help bring that about, Guidash speculates, but why wait? "Bring in pieces of CASE now, get users and programmers accustomed to what it is," he says, "and you'll make the CASE transition smooth."

And while what you deliver with CASE doesn't have to be big, it at least has to be useful, Bouldin adds.

"It can't be smoke, and it has to be done fast to keep interest alive," she explains. If you follow such advice, she maintains, you will lay a strong foundation for CASE that will give you executive and user support for years, not just months.

Lipson, who says the Bank of New York has now completed about 20 major banking applications using CASE, says a firm systems programming methodology should be in place before CASE is brought in. "CASE strengthens methodology."

And if he were just introducing CASE into his corporation today? Lipson says he would apply an im-



**ANDERSEN CONSULTING'S BERGSTEIN** says CASE will change IS' role to that of keeper of the system architecture.

portant lesson he learned the first time around: Downplay the technical merits and sell it as a tool that will decrease drudgery. "Everyone understands that," he says. ♦



## MEANS COMPUTER ROOM AIR CONDITIONING.

From small, ceiling-mounted units to 30-ton mainframe chillers, and everything in between, Airflow Company has the ideal precision environmental control solution for you.

### **Airflow Company**

295 Bailes Lane  
Frederick MD 21701-3136  
Tel: 301/695-6500  
Telex: 160998 AIRFLOW UT  
Facsimile: 301/695-4057

Circle Reader Service Number 18



## When choosing a network access package...why settle for just a piece of the pie?

If all you want is access to your network, a number of software vendors can help you. But, if you want more than just a piece of a product, you need NCI from Westinghouse.

Network Control Interface gives you the power of total network control. It is the only network access and control product available for MVS, MVS/XA, VSE and VM operating systems. In fact, regardless of the size and complexity of your VTAM network, NCI provides all your users with a single system image, with identical entry screens and procedures.

Of course we give you single point entry for quick application access at the push of a single key. That's the easy part. But we also provide application load balancing, logon queuing, unlimited exit processing and a dialog manager...powerful features to improve your productivity...without sacrificing system performance.

NCI can read the contents of your security data base and dynamically build user menus, listing only applications the user is authorized to access...reducing user confusion and simplifying security administration.

With NCI, you can customize menus to meet your specific user needs, or use some of the over 100 sample panels provided in our Starter System...the options are unlimited.

To truly appreciate the power of NCI, we invite you to call or write us for a free, 30-day trial.

More than just simple network access...NCI from Westinghouse.



**Westinghouse**  
Management Systems Software

P.O. Box 2728  
Pittsburgh, Pa 15230  
(800) 348-3523  
(412) 256-2900 in PA

ETHERNET is so overloaded they might as  
 DIV →

DATE	OPEN	CLOSE	CHG	%	HIGH	LOW	VOLUME
30 INDUSTRIALS	1922.25	1879.14	-57.20	-2.95	1934.85	1858.59	24,067,600
MAR 23	1922.25	1879.14	-57.20	-2.95	1934.85	1858.59	24,067,600
MAR 22	1904.64	1946.45	+42.94	+2.26	1960.54	1907.05	23,032,400
MAR 21	1892.90	1903.51	+24.50	+1.29	1911.80	1876.16	13,439,400
MAR 18	1938.00	1939.32	-25.86	-1.33	1957.73	1906.50	16,716,000

# How Networks Talk W

They don't. Confused, interrupted, unproductive communications are the usual result when you try linking large networks together. So far, creating an environment where users have access to every computing resource has been a frustrating, elusive goal.

But this situation is changing, with help from the pioneer in high-performance networking—Network Systems. Our HYPERchannel® network brings together Cray, IBM, DEC, Control Data, Hewlett-Packard, and dozens of other processors and peripherals on a single network; a network

© 1989 Network Systems Corporation. Control Data is a trademark of Control Data Corporation. DEC is a registered trademark of Digital Equipment Corporation. IBM is a registered trademark of International Business Machines Corporation. Cray is a registered trademark of Cray Research, Inc.

well xmit data via U.S. Mail

CONTINUE  $\infty$

FORGET IT—JUST DUMP IT TO TAPE AND  
Time\*  
16

WRITE (6,103) X  
GO TO 1 CALL FOR AUTHORIZATION  
WRITE (6,102) X,  
GO TO 1  
STOP X  
END

0103 0500 0050 0024 0021  
009B 0000 0400 0100 0103  
00AE 0000 0178 FF28 023C  
0303 0100 0035 0000 0025  
023F FEC1 0002 0002 0000  
0001 FE54 0200 0100 0303  
0026 11C7 0037 FFFF 023E  
0203 0200 0035 0000 0025

UNO732% CAP330%  
CAG45% CAG41%  
NWA39% UNO732%  
UNO732% UNO732%

When We're Not Around.

that moves information at channel speeds.

And now, our HYPERchannel-DX and IP Router products *network the networks* by integrating a variety of protocols and media standards. That means all your isolated networks can now work together, giving you greater connectivity,

seamless operations, and higher performance throughout your organization. For a free on-site consultation about your networking needs, call Hal Lundberg

at 612-424-4888.



**Network Systems.**

7600 Boone Avenue North, Minneapolis, MN 55428  
Sales and service offices worldwide.





MARK HOLSTER/ARMOR LITTON

**ROBERT LOGSTON'S** expertise helped him forge steelmaker Timken Co.'s integrated data base success.

# FIT TO BE t i e d

BY MARK BREIBART

**S**TEEL MILLS DON'T usually conjure up images of advanced technology. Their blackened stacks are far more often used to symbolize industrial decline. But Timken Co.'s Faircrest steel plant has turned that stereotype on its head. Not only does its integrated steel process turn scrap metal into speciality steel bars as efficiently as any plant in the world, but its computer systems tie together disparate databases in ways that other organizations can only wish for.

The needs of real-time computing in manufacturing may add a level of complexity that most companies are spared. But whether it is two machines, the payroll and personnel systems at corporate headquarters or a bank's deposit and loan systems, the issue is the same — application systems need to share data with each other.

If they don't — and most don't — departmental systems can cost the corporation money because they are acting in isolation. Or upper-level managers, trying to make strategic decisions, can get the relevant information only after great effort, if at all. Methods such as electronic mail, file transfers or uploading and downloading are usually too ad-hoc and too fragmented to do the job.

At the Faircrest plant, Timken has managed to put it all together. The

**Integrat-  
ing data-  
bases  
isn't  
easy,  
but it  
does  
have its  
rewards.**

---

Canton, Ohio, maker of tapered roller bearings has built a pyramid-like computer system that both controls production and prepares information for managers on all levels to help them fine-tune the process. Data flows sideways and up and down the hierarchy as automatically and smoothly as the steel itself moves from the railroad cars filled with scrap through the furnace and to the rolling mill at the end.

The idea, says Robert Logston, computer-integrated business specialist at Timken, is "to try to take steel-making from an art to a science."

For example, partway through the process, the molten metal is tested to see if its alloy content is exactly what the customer ordered. If it isn't, metallurgists at the plant-level computer get the results from the chemistry

lab's computer and scan future orders to see if the steel meets the requirements of another customer. If they find a close fit, their computer then updates all the process control computers on the plant floor with the specs for the new order.

But Timken's success is unusual. For most companies, there's no mistaking the dearth of integrated applications. In a 1987 year-end survey of about 100 large companies, 60% had corporate electronic mail, and 78% downloaded data from the mainframe to personal computers. Yet only 19% of these same companies said they had adequate integration of their databases, according to Link Resources Corp. in New York.

Companies are slowly beginning to do something about their systems hodgepodge, however, as a variety of forces push and tug them.

Pushing them is the drive for increased productivity and the cost savings that come when the left hand

**The im-  
petus to  
inte-  
grate  
can  
come  
from  
outside.**

knows what the right hand is doing.

Take Burlington Northern Railroad, for instance. The information system that tracks the engines the firm leases from an outside source wasn't linked to its repairs system. The costly results of such a separation? The railroad undertook a major repair project on one of its leased locomotives just as the contract for the train ran out, says Lynn Ruth Davis, the lead data administrator in Burlington's information architecture group. She was brought in to put together Burlington's diverse computer setups; her first project was combining the disparate locomotive systems.

Sometimes, the impetus to integrate comes from outside the corporation. Customers demanding electronic data interchange or consolidated billing statements, for example, can force a company to change its individual product systems.

With banks, regulatory agencies require adequate loan-loss reserves as protection against customer defaults. For Affiliated Bankshares of Colorado, a \$2.5 billion regional bank holding company, calculating the risk posed by any particular customer was a laborious, often manual process. Not only were customer accounts spread across the mortgage, commercial and personal loan systems, but each of the 29 member banks had its

**Few or-  
ganiza-  
tions  
have the  
luxury  
of start-  
ing from  
scratch.**

own system. Sue Osterfelt, the information resource manager for the bank's data processing subsidiary, says that a group is now collapsing all the loan systems and customer databases into one system to create a fast, reliable way to determine if and when loans will go bad.

Despite the crying need for systems that work together, the obstacles can be daunting. The most pervasive problem, says William Inmon, senior principal at American Management Systems, Inc., "is that people, once having built systems, don't want to change them." And those systems, built application-by-application, "are fairly badly integrated," adds the database guru based in Lakewood, Colo.

Yet few companies have the luxury of starting from scratch. Timken did, because Faircrest was a "greenfield" steel plant — built on an empty field and completed in 1985. That's one reason its computer control system is so finely meshed together.

## WHERE TO BEGIN? WITH A BUSINESS VIEWPOINT

**WHEN INTEGRATING** databases, forget about physical files, applications and methods of implementation and focus on the business view of data. While IS people can guide development, the source of an integrated data model should be functional managers, says Jim Funk, a data administrator who helped build a data model at Wisconsin Gas Co. in Milwaukee and has been hired by Johnson & Johnson to do the same.

For the first application to build within the model, IS staff should look for a project that is small and doable to convince the skeptics that IS can deliver, and quickly. They also should look for something that has had a significant impact on the business, because corporate officers will ask, "What's it going to do for me?" says Sue Osterfelt, information resource manager at Affiliated Bankshares of Colorado.

Finally, project managers need to get and keep users involved, from the design of the data model to the capabilities of the application. J. D. Welch, manager of decision support at Pactel Cellular in Irvine, Calif., may have gone further than most. He let users actually choose which SQL system they wanted to use on the decision support database he helped build from several production systems.



**CORPORATE OFFICERS** look for business impact, Sue Osterfelt says.

NOW THE FAST TRACK IS AN ECONOMY RUN.

## INTRODUCING GANDALF'S NEW 19.2 KBPS METRO MODEM.

When your run is within 200 miles (300km), why spend the money for a 19.2 Kbps long-haul modem? Gandalf's new LDM192 Metro Modem gets you there for much less.

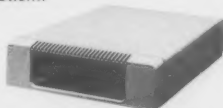
Besides the low price, the LDM192 cuts operating costs too, running on 4-wire leased lines. And, it supports synchronous and asynchronous communication in point-to-

point configurations, including multiplexer backbones and Front-End Processor to Cluster Controller applications.

Our low cost still buys you the most advanced digital signal processing, plus auto-equalization for easy installation. A rack-mount model is also available.

So speed up your metro communications while keeping

costs under control with Gandalf's new LDM192 Metro Modem.



**gandalf**  
Productivity  
Through  
Connectivity

UNITED STATES IN ILLINOIS CANADA UNITED KINGDOM FRANCE EUROPE AUSTRALIA  
1-800-GANDALF 312-541-6060 613-723-6500 0925-818484 33-1-47-60-0032 31-20-867611 02-437-5977  
© 1989, Gandalf Technologies, Inc.

Circle Reader Service Number 21



## CHILDREN'S HOSPITAL STARTS FROM SCRATCH

**HOSPITALS HAVE LONG BEEN** familiar with integrated databases — the paper kind anyway, with their color-coded medical record folders. Although they may have computerized their fiscal operations, when it comes to automating their core business, the clinical departments, hospitals have lagged far behind their business counterparts.

Children's Hospital in Boston is no exception, says David Margulies, vice-president of information systems. In the fall of 1986, he was hired with a mandate most corporate IS directors would envy — to develop an information system that would integrate the major functions of finance, clinical practice, research and administration.

The main reason for the hospital's change of heart was financial, Margulies says. Children's, like other medical facilities, has been running at a deficit for several years. Top management needed to track the use of every resource to determine its costs and benefits. But the hospital's fragmentary and aging computer system was not up to the job.

Essentially starting from scratch, Margulies chose his strategy: He decided to weave together departmental systems from a variety of vendors.

The pieces are tied together in two real-time ways that make information immediately available hospital-wide and that avoid batch updates. Certain events, like the registration of a new patient, are broadcast across a 4,000-node network to be picked up by any applications that need it. More detailed information is also automatically sent by each departmental system to a

central database of all public hospital information.

Even though information systems is only in the middle of its three-year plan, many of the system's benefits are already apparent, Margulies claims. Departments that had never been automated, for example, now are and have become more efficient. And the clinical staff can track a drug from the moment it is ordered to the moment it is administered to a patient.

There also has been the "culturally transforming" impact of electronic mail, whose uses range from gossip to signing out patients to electronic discussions by the administration.

### But you can't make them drink

Despite its successes, the system has run into the you-can-lead-the-horse-to-water problem. Thanks to the integration of departmental data, it is now possible to compare the costs of different therapies for a certain disease, a central issue for the facility from the beginning. But managers use the capability only sporadically, Margulies says. "Having an information system does not create the managerial will to use it."

While time may solve that problem, the information system has already hit limits elsewhere. Though it can identify the therapies that make and lose money, it can't tell the doctors what's right to do. It is easy to decide to do the medical treatments that are inexpensive and effective and those that are expensive but medically necessary, Margulies says. But there are many treatments in the gray, "ethically complex" middle, he adds. Those are questions no computer can answer.



DAVID MARGULIES gathered together a variety of vendors' systems for Children's Hospital.

For most companies, however, retrofitting is the name of the game. Unable to rebuild existing systems, yet unable to answer decision support questions with them, IS managers have few choices. One is to find or make a product that lets an analyst use data from different systems as if they were one, a kind of "know-it-all" interface. More commonly, they build a super database to extract data from the current, unmodified systems. It's not true integration, but it's doable.

Extracting, though, comes with technical and organizational problems. For starters, there is the connectivity issue of dealing with multiple hardware and software systems.

Even trickier is that users of different applications can interpret data elements in a variety of ways.

For Don French, manager of integrated decision support at General Electric Medical Systems in Milwaukee, "making data elements consistent has been the most painful piece" of creating a central information

**Extracting data is  
not true integration,  
but it's doable.**

base. But without that step, he says, it would have been nearly impossible to analyze the expense of performing warranty work. "Finance gets its numbers from the general ledger; service and engineering get their numbers from another system. So the numbers often don't match, and there is no way to get back to the details because there is no automated relationship between the systems."

#### Overcoming vested interest

Equally common is the less objective resistance Doug Buchanan found when Dofasco Steel tried to implement a computer system in its steel plant in Hamilton, Ont. "We weren't just integrating databases, we were

integrating departments and people," he says. Now that the system is in, says the manager of software services in an engineering unit, groups have learned to overcome feelings of vested interest in their data.

One of the reasons for such political resistance is that the sponsors of integrated applications usually come from the information systems side, not the business side. They are aware of the data redundancies and inconsistencies and of the difficulties of pulling together far-flung applications for management reports.

Integrating databases and applications is taking connectivity that last, often painful step. But acceptance can be refreshingly clear. As soon as GE's prototype of a warranty expense analysis system was ready, for example, other managers began clamoring for systems. French says he no longer has to worry about persuading the doubters; instead, he has to control expectations that are rising faster than he can handle. Everyone should have such problems. ♦

COMPUTERWORLD

focus  
on

# Integration

## 1989 Editorial Calendar

Issue Date	Ad Close	Editorial Topic*	Trade Show Distribution
Feb. 6	Jan. 12	Integrating the Network	Communication Networks
Apr. 3	Mar. 3	Connectivity & Standards	Comdex Spring
June 5	May 5	Network Management	PC Expo
Aug. 7	July 7	Multivendor Connectivity	Networld
October 2	Sept. 1	Enterprise Systems	Info '89
Nov. 6	Oct. 6	Local Area Networks	Comdex Fall

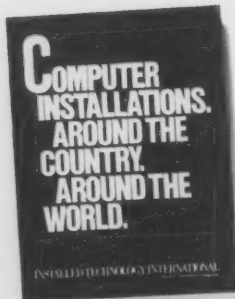
\*Subject to change.



# Beat your competition to the computer markets of the future. Call 1-800-551-6245.\*

As international computer markets really take off, vendors are quickly claiming their shares. But before you can get the profits, you've got to locate the spenders.

Installed Technology International can lead you to more than 160,000 sites of installed computer equipment worldwide, including nearly 60,000 outside the U.S. Because we have the most comprehensive worldwide database of computer installations you'll find. Anywhere.




Company names and addresses. Industry codes. Decision makers names and titles. Hardware and software information. It's all right there. And you can pick and choose just the sites that meet your criteria.

If you want to find the markets of the 90's, there's only one place to look. Installed Technology International. For a **FREE** brochure, call **1-800-551-6245, ext. ITI.\***

\*Outside MA, call 1-800-551-6245, ext. ITI.

\*In MA, call 1-800-262-5226, ext. ITI.

## INSTALLED TECHNOLOGY INTERNATIONAL

Five Speen Street, P.O. Box 9015, Framingham, MA 01701 FAX (508) 879-0184 

# The Market Leaders...

**THE WALL STREET JOURNAL**  
40 Years of Service to the American Investor  
 VOL. CXXIII No. 46      MONDAY, SEPTEMBER 23, 1986      50 CENTS

**The New York Times**  
"All the News That's Fit to Print"

**Advertising Age**  
For the Advertising Executive  
**RETIME**  
For the Retailer

**COMPUTERWORLD**  
For the Computer Professional

**INSIDE**  
 Product Spotlight —  
 and to IBM's 100th  
 birthday. Page 31.

**In Depth** — The 100th  
 birthday of IBM.  
 Page 47.

**IBM sells 100th**  
 birthday celebration  
 on the Web. Page 7.

**Microsoft's grip on the**  
 market.  
 Page 11.

**Amazon and 200,000**  
 up to Computer's 100th  
 birthday. Page 15.

**U.S. Bank merged**  
 to form 17 million.  
 Page 19.

**Shapiro has a Red day**  
 on the 100th birthday.  
 Page 23.

**Apple leads IBM**  
 to lead the 100th birthday.  
 Page 25.

**Break up these big**  
 banks.  
 Page 27.

**IBM's 100th birthday**  
 on the 100th birthday.  
 Page 29.

**IBM's 100th birthday**  
 on the 100th birthday.  
 Page 31.

**MIS puts PC**  
 mavens in  
 support role

**They're here! AS/400s sited**  
 Power-hungry mainframes step of relief as mid-range delivers on gains

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

**Computer Associates' drive**  
 wins respect but few friends

## And, They're All Paid.

The publications depicted above are all the undisputed leaders in their markets. Editorial excellence, readership and reader preference, advertising lineage... every critical measurement shows them on top.

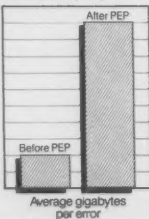
While they serve different audiences and different markets, they share one key characteristic. Their readers pay to receive them.





## Protect your library's performance with this free BASF program.

How well do your 3480-compatible drives and library perform? Now you can get accurate and comprehensive reports that pinpoint current and potential problem areas. And it won't cost you an extra penny. When you order BASF Chrome Tape Cartridges, you can get our exclusive Performance Evaluation Program, or "PEP," a simple, all-encompassing approach to library maintenance and system performance evaluation. PEP is derived from your EREP diagnostic data, and provides six regular indices of performance trends, and determines whether



or not your systems are running well.

### Here's what PEP provides:

- Analyses of historic EREP information
  - Graphic management reports
  - Identification of all suspect media by volume serial number, device number, and time period.
  - Notification of hardware problems
  - Computation of actual system performance
  - Theoretical data after purging
- Using PEP data, you can keep your 3480-compatible drives and library at peak operating efficiency. For complete details, see your BASF representative today or call 1-800-343-4600.

**BASF Corporation** Information Systems  
Crosby Drive, Bedford, MA 01730-1471

## MARKETWISE

## Corporate networking grows up

By Stan Kolodziej

The big business network user is growing up. And it seems that many network vendors are going to have to do the same if they want to compete in the corporate networking world.

Peter Simon, vice-president of marketing for Banyan Systems, Inc., a Westboro, Mass., networking company,



sees the corporate networking market forming into two tidy segments. At the bottom is the work group segment, which is distinguished by small

local-area network installations consisting of five to eight network servers. The top level is the organizational networking market, and that, Simon says, is where all the corporate networking action is headed.

Organizational networking is the world of multivendor networks,

standards, large-scale customized network applications, wide-area networks and large-scale data integration.

But the world of integration according to Banyan isn't that clear-cut. When Simon talks about this upper networking echelon, the product and marketing

lines separating vendors such as DEC, IBM and Banyan begin to blur.

All vendors that integrate systems are on a big push to integrate and distribute databases: The network vendors look to software developers to provide the database tools, while the systems vendors look to communications companies to provide the network tools that will move the data more easily. Many tools, such as remote procedure calls and application programming interfaces, are part of the marketing weapons of various systems and networking vendors.

Both Novell and 3Com, for example, are buying and comarketing technologies that will help them become organizational networking forces in their own right. Even Ungermann-Bass is beating its chest as the organizational, or enterprisewide, networking company of note.

Networking vendors can basically make the same connections in multivendor networks, using basically the same tools. The big difference, however, will be in software value-added from resellers and marketing.

That means a heavy marketing entry fee for all vendors of integration plans. Simon, for example, says Banyan is doubling the number of its value-added resellers, sales reps and service and support facilities.

Other network vendors are right behind it.



SIMON wants Banyan to be a corporate networking force.

## CORNER OFFICE

## The lean, mean money-making machine

By Sarah B. Kaul

Today's business challenges are different than those of the 1960s and '70s. Back then, an environment of easy growth, gentle competition and unsophisticated customers prevailed. Companies were structured to control growth, and this demanded the decomposition and simplification of activities at the local level.

But these narrow, fragmented organizational structures have resulted in a lack of responsiveness and flexibility within businesses.

Easy growth is a thing of the past; today's critical business issues are quality, innovation, customer service, responsiveness and "being easy to do business with." These issues transcend organizational boundaries; unfortunately, firms are still organized by specialized activity and not in a way that will permit the achievement of these key, pervasive goals. In fact, the typical corporation is a collection of independent business units loosely connected to each other. These piecemeal structures will not work in the current business environment.

How can companies pull together to work as a coherent whole with a shared focus on key business issues?

Information technology is the tool by which this necessary functional reconstruction can be achieved. A new type of system, the cross-functional system, can support multiple

*continued on page 74*

# "The Data General difference: For VARs, OA to make your application package more attractive."

Introducing CEO Light™, a new vision in office automation. It's software that's heavy on performance, but light on system demand and cost.

A streamlined version of our industry-leading CEO® office automation software, CEO Light can be efficiently integrated with your vertical solution. It can satisfy your customers' needs for OA functionality. Yet still leave plenty of machine for your all important customer application.

CEO Light incorporates only the most popular features of CEO—Electronic Mail, Calendar, Filing and more—minimizing demand on system resources. As a result, CEO Light is easy to use and maintain, and significantly lowers OA costs.

Plus, it can be tailored to your customers' individual needs. You can inte-

grate their existing word processor, so less training is required. Or, you can choose from either CEOWrite™ or WordPerfect®. CEO Light accommodates both.

CEO Light might be just the competitive edge you need to wrap up more business in your vertical market.

For more information, send the coupon below. Or call: 1-800-DATAGEN. In Canada, call 416-823-7830.



3400 Computer Drive, Dept. ADV/CEO/LT, Westboro, MA 01580

Name

Company

Address

City  State  Phone  Zip

**CALL 1-800-DATAGEN**

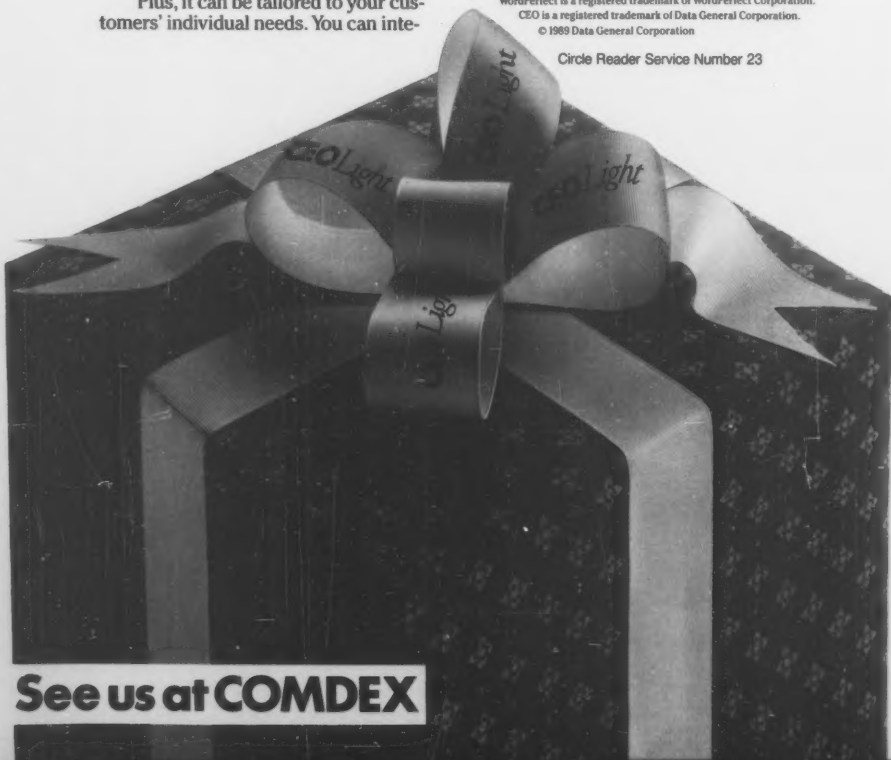
CEO Light and CEOWrite are trademarks of Data General Corporation.

WordPerfect is a registered trademark of WordPerfect Corporation.

CEO is a registered trademark of Data General Corporation.

© 1989 Data General Corporation

Circle Reader Service Number 23



**See us at COMDEX**

COMPUTERWORLD

focus  
on

## Integration

## Reader Service Card

Date: April 3/Expires: June 16, 1989

Please  
Use  
This  
Card  
For  
Product  
Information

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_ Phone \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## A. Please check the business/industry in which you work: (check one)

## End Users

- 1 ☐ Manufacturer (other than computer)  
 2 ☐ Finance/Insurance/Real Estate  
 3 ☐ Medicine/Law/Education  
 4 ☐ Wholesale/Retail/Trade  
 5 ☐ Business Service (except DP)  
 6 ☐ Government - State/Federal/Local  
 7 ☐ Public Utility/Communication Systems/Transportation  
 8 ☐ Mining/Construction/Petroleum/Refining  
 9 ☐ Other User \_\_\_\_\_ (please specify)

## Mentions

- 10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals  
 11 ☐ Computer Service Bureau/Software/Planning/Consulting  
 12 ☐ Computer/Peripheral Dealer/Distributor/Retailer  
 13 ☐ Other Vendor \_\_\_\_\_ (please specify)

## B. Please check your main job function: (check one)

- 1 ☐ Corporate Management  
 2 ☐ Financial Management  
 3 ☐ MIS/DP Management  
 4 ☐ MIS/DP Operations  
 5 ☐ Data Communications Management  
 6 ☐ Data Communications Operations

## C. Reason for this inquiry: (check one)

- 1 ☐ Immediate purchase  
 2 ☐ Future purchase  
 3 ☐ Information only

## D. Is this your personal copy of Computerworld Focus on Integration

- 1 ☐ My personal copy  
 2 ☐ I'm a pass-along reader

## E. Please check the number of employees in your company: (check one)

- 1 ☐ Over 1,000 employees  
 2 ☐ 501-1,000 employees  
 3 ☐ 500 or under

Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1 21 41 61 81	101 121 141 161 181
2 22 42 62 82	102 122 142 162 182
3 23 43 63 83	103 123 143 163 183
4 24 44 64 84	104 124 144 164 184
5 25 45 65 85	105 125 145 165 185
6 26 46 66 86	106 126 146 166 186
7 27 47 67 87	107 127 147 167 187
8 28 48 68 88	108 128 148 168 188
9 29 49 69 89	109 129 149 169 189
10 30 50 70 90	110 130 150 170 190
11 31 51 71 91	111 131 151 171 191
12 32 52 72 92	112 132 152 172 192
13 33 53 73 93	113 133 153 173 193
14 34 54 74 94	114 134 154 174 194
15 35 55 75 95	115 135 155 175 195
16 36 56 76 96	116 136 156 176 196
17 37 57 77 97	117 137 157 177 197
18 38 58 78 98	118 138 158 178 198
19 39 59 79 99	119 139 159 179 199
20 40 60 80 100	120 140 160 180 200

I have circled #200 on the Reader Service Card to enter my Computerworld subscription for one year, 51 weekly issues and special bonus sections of Computerworld Focus on Integration for \$48 and please bill me later. This rate valid only in the U.S. ③

COMPUTERWORLD

focus  
on

## Integration

READER  
COMMENTS

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_ Phone \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

- Which articles/topics were most interesting to you in this section? \_\_\_\_\_
- What articles/topics would you like to see covered in future section? \_\_\_\_\_
- What are your most important integration problems? \_\_\_\_\_
- What are your most pressing management problems? \_\_\_\_\_
- Are you responsible for integrating the computer resources in your organization? If so, what elements of your company have you integrated? \_\_\_\_\_
- What do you like most about Computerworld Focus on Integration? \_\_\_\_\_
- What do you like least? \_\_\_\_\_

Please  
Fill  
Out  
This  
Card  
For  
Editorial  
Comments





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

**Computerworld Focus on Integration**

Post Office Box 5112  
Pittsfield, MA 01203-9930



Place  
Stamp  
Here

Attn: Ann Dooley  
Computerworld Focus on Integration  
375 Cochituate Road  
Framingham, MA 01701-9171

## ACHIEVERS

# It's business as (un)usual for Big Apple CIO

By Mark Breibart

### THE ISSUE

Rocked by a financial loss and a turnover in top management, the Dormitory Authority of New York needed a complete internal overhaul.

### THE SOLUTION

The newly hired CIO used technology and a user-oriented philosophy to modernize operations and integrate isolated departments.

RON WOOLDRIDGE is not your typical chief information officer. Unconventionally groomed for his role by a stint in the Peace Corps and years as a statistician in the New York state office of mental health, he had never worked in an information systems department. But that was OK with Chris Richmond, newly hired executive director of the Dormitory Authority of New York, because there was nothing business-as-usual about his organization in the crisis-filled days of early 1983.

Late the previous year, the authority, a quasi-public agency that annually handles over \$1 billion in financing and has over \$3 billion in construction under way for public buildings like state universities and medical centers, had taken a financial bath. Lombard Wall, a government securities firm holding some of the authority's investments, had gone bankrupt. A new chairman was appointed for the authority, much of top management left and Richmond was brought in.

The disarray, Richmond recalls, was systemic: "The agency was run by senior management like a ma-and-pa organization, with no involvement of middle management." Its construction and finance departments lived in "totally different cultures."



CHUCK LABOUCHE

### DOER'S PROFILE:

#### RON WOOLDRIDGE

**Insight into management:** *The corporation is a battleground between left- and right-brainers. On the CIO and his technical staff:* *Like the civilian control of the military — the secretary of defense should not be a general. How he relaxes:* *Hops into his Alfa Romeo, puts the top down and heads to Montreal to shoot snooker.*

Few construction managers knew, for example, that if they incorrectly estimated the cash flow needs for their projects, the finance people could lose money on investments by having to come up with the cash more quickly than anticipated.

In Richmond's eyes, building an information system — there was none at the time — was key to cleaning up the mess. "Unless you could

provide managers with information from all areas, you couldn't ask them to affect the business positively."

For Wooldridge, the IS plan was a tall order, made taller by his atypical background as an end user, not a technical person. But today, the authority has systems in place for all essential requirements. Virtually all 220 employees have a PC or workstation connected to central Prime Computer, Inc. machines, and their software applications, which include electronic mail, desktop publishing, computer-aided design, project budgeting, investment management and critical path scheduling, are almost all linked together.

The key was that Wooldridge wanted a system that looked good from the desktop, not from the computer room. "Ask a computer person for a diagram of a system, and you'll see a big computer in the middle, with the users way out there on the edges. I see the user in the middle of the picture, and somewhere on the periphery is the technology that makes it happen."

To put together the initial plan, he spent his first few months on the job walking around, dropping in on people, learning what they needed. Together with Conrad Blickenstorfer (see box), his "resident technical genius," he next brought in small but useful PC applications to introduce

*continued on page 74*

## A 'resident technical genius'

Conrad Blickenstorfer, the Dormitory Authority's director of information systems, is as atypical a systems person as his boss — he was trained in Switzerland as an architect. He says that he and Wooldridge spend "hours discussing Lotus, chips, boards and software." Where Wooldridge is the dreamer, Blickenstorfer says his strength is in figuring out what will work and what won't.

He is also responsible for putting the ideas into practice. "Ron is a master of selling concepts; I do the purchase, integration, implementation and dazzling demos to convince the user."

But just as important as the technical skill is that Blickenstorfer "finds the technology enormously exciting." As he went around the Dormitory Authority selling managers on computer systems, his enthusiasm was catching. Within a year of trying to get them involved, the users, with his help, have developed more than 50 interim applications.



## What has been your main obstacle to integration?

We asked the question above of IS professionals around the country. It looks like vendors need to get their compatibility acts together. Take a moment to compare the responses to your own experiences.



"One of the greatest barriers to integration is the lack of standards that cover at least a basic level of connectivity among our computing platforms."

**ROGER BAST,**  
DIRECTOR OF  
COMPUTING  
SERVICES, MIS  
AIR PRODUCTS &  
CHEMICALS, INC.  
ALLENTOWN, PA.



"Our main problem is achieving compatibility across vendors."

**J. R. GARRETT,**  
MANAGER OF  
TECHNICAL SERVICES  
FINAL OIL AND  
CHEMICAL CO.  
DALLAS

"We have a unique environment — Data General minis connected through a satellite network to corporate. Our major obstacles have been the processing protocols in an asynchronous environment."

**DALE HELLER,**  
ASSISTANT VP  
OF MIS  
SERVICE  
MERCHANDISE CO.  
NASHVILLE



"Vendors are dragging their feet on products that will help us integrate. I've been trying to get our integration project going for 1½ years now, but the vendors don't have the products that can help."

**PATRICK JOHN LEE**  
DIRECTOR OF EDP  
TOWNECRAFT, INC.  
GLEN ROCK, N.J.



"The main obstacle to our integration plans has been the lack of end-user awareness of the value of integration as well as its complexity."

**JOHN ERIC THOMAS,**  
DIRECTOR OF  
INFORMATION  
SYSTEMS AND  
SERVICES  
JOHN C. LINCOLN  
HOSPITAL AND  
HEALTH CENTER  
PHOENIX

"I can sum it up in two words: vendor incompatibility."

**PHILLIP CHAMBERS,**  
DIRECTOR OF IS  
DIVINE PROVIDENCE  
HOSPITAL  
WILLIAMSPORT, PA.

### ACHIEVERS

*continued from page 73*  
users to the technology.

Once managers were interested, Wooldridge and Blickenstorfer needed a corporatwide system. At the core was a software package called Intact 50 from T and B Computing, Inc. in Ann Arbor, Mich. It tied together the finances of a project from the initial budget to final construction. And, most important for Richmond's management overhaul, it wouldn't work unless both the finance and construction departments used it. The package has "helped change the virtual autonomy of the organization that had contributed to its downfall," Wooldridge says.

Whatever the strategies and technologies, it takes the right people to

implement them. What Richmond calls the "vision" and "evangelism" of his CIO were part of the project's success. But Wooldridge, a native of West Virginia, also has what Blickenstorfer calls "Southern charm," a trait that helped him in his role as a nonthreatening liaison between users and systems people.




To take the current systems one step further, Wooldridge's pet plan is to provide an on-line users' guide of the buildings the agency constructs. Complete with everything from floor plans to maintenance specs for the air-conditioning units, the computerized manual would "take systems beyond being overhead to being what we deliver to clients." Not a bad plan for someone with no systems background.

### CORNER OFFICE

*Continued from page 71*  
business units and change the way they work and relate. Types of cross-functional systems include electronic mail to spread awareness; data interchange to ensure internal company consistency; shared databases to permit a common company vocabulary; and shared applications for the combination or integration of business functions. Cross-functional systems can rebuild a corporation to address contemporary business issues that transcend organizational boundaries.

*KAULL is the associate director of the Partnership for Research in Information Systems Management, or PRISM, a joint venture between the Index Group, Inc. and Hammer & Co. PRISM, headquartered in Cambridge, Mass., does research for approximately 100 sponsors from Fortune 200 corporations.*



# You choose broadband or fiber. We'll make it perform.

The security, noise immunity, long distance and easy expandability of fiber optics.

The interconnectivity, capacity, and full service capability of broadband.

The choice is yours. But either way, Chipcom's complete line of connectivity devices will make your Ethernet LAN perform. With full 10 Mbps throughput and 100% CSMA collision detection.

Until now, the real world high performance, reliability and superior diagnostics of Chipcom's Ethermodem™ family of connectivity products has been available only to broadband users.

Now we bring Chipcom's commitment to Ethernet excellence to the fiber optic user as well, with our new ORnet™ active star fiber optic system. ORnet is the only family of fiber optic couplers and transceivers that give you true 10 Mbps performance, standard redundancy features, long distance links and extensive diagnostic capabilities to let you spot faults at a glance. And like all Chipcom products, ORnet is fully IEEE compatible.

At Chipcom, we're fully committed to total Ethernet connectivity and performance. No matter what medium it's running on.



## CHIPCOM

*Quality products. For reliable networks.*

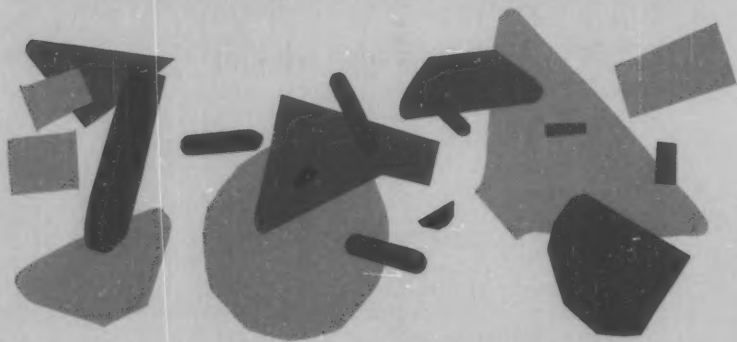
195 Bear Hill Road Waltham, MA 02154  
617-890-6844 Telex: 928338 Fax: 617-890-6857

Circle Reader Service Number 24

Ethermodem and ORnet are trademarks of the Chipcom Corporation.



## How Ameritech helped The Dow Chemical Company



find the right formula.



When Dow needed a voice and data system that could connect more than 10,000 lines throughout 700 buildings in two counties, they conducted some intensive research and chose Ameritech.

The solution was a custom-designed digital communications system that could transport large quantities of information quickly and accurately. A system that could incorporate Dow's comprehensive safety alert network.

A low-risk system that was designed and installed by an Ameritech team.

For Dow, the answer was Ameritech.

Because when two businesses develop such a strong partnership, it produces good chemistry. Whatever your communications needs, Ameritech has the solution for you. Call us: 1 800/242-8580.

Solutions that work.

**AMERITECH**

Illinois Bell   Indiana Bell   Michigan Bell   Ohio Bell   Wisconsin Bell  
Ameritech Applied Technologies   Ameritech Credit   Ameritech Development   Ameritech Information Systems  
Ameritech Mobile Communications   Ameritech Publishing   Ameritech Services   Tigon Voice Messaging

© 1988 Ameritech

Circle Reader Service Number 25



♦ f r o m ♦  
**SLOAN MANAGEMENT  
 REVIEW**

Winter 1989

Forces are at work that will bring about a revolution in the way we structure our organizations, but we may not be up to the challenge. There is a major roadblock to bringing about organizational change: We take hierarchy for granted.

From "Reassessing the 'divine rights' of managers" by Edgar Schein.

♦ f r o m ♦  
**SCIENTIFIC AMERICAN**

February 1989

Computers based entirely on high-temperature superconductors are not feasible at this time. What is more likely, however, is a hybrid system that combines Josephson logic circuits and semiconductor memory, all operating at 77 degrees Kelvin. The system could be incorporated into parallel processing architectures for supercomputers that will be 1,000 times faster than those now on the drawing board. But for the near term,

superconductors may be limited to interconnections linking one semiconductor device to another.

From "The new superconductors: Prospects for applications" by Alan Wolsky, Robert Giese and Edward Daniels.

♦ f r o m ♦  
**SLOAN MANAGEMENT  
 REVIEW**

Winter 1989

Business ethics and international economic competitiveness are inseparable. To strengthen our moral sense, ethical instruction needs to start in childhood, during which time we fortify our "ethical buttresses"—role models, codes of conduct and the honor system. Children should also study the past, including history and literature, from which our ethical standards come. Finally, we should realize that the good of society transcends that of any single company.

From "Ethics and competitiveness — Putting first things first" by John F. Akers.

♦ f r o m ♦  
**ISSUES IN  
 SCIENCE AND TECHNOLOGY**

Winter 1988-1989

Of the \$95 million in federal funds for superconductivity research in 1988, \$46 million was allocated to the Department of Defense, \$27 million to the Department of Energy and \$14.5 million to the National Science Foundation (NSF). The allotment for fiscal '89 is \$135 million; it is expected to be parceled out in a similar manner.

However, money may not be enough in the face of international competition. To strengthen the U.S. position, we must give the NSF a larger role, put together industrial consortia with federal cost-sharing and form a national body for commercialization.

From "Bringing superconductivity to market" by Dorothy Robyn, W. Wendell Fletcher and John Alic.

♦ f r o m ♦  
**HARVARD BUSINESS REVIEW**

January-February 1989

In the rush to automate, the next frontier is in marketing and sales. There are cases in which sales increases from technology have ranged from 10% to 30%, with return on IS investment exceeding 100%. But such systems cannot work miracles. They will not compensate for an inferior sales force, nor will they sell inferior products.

From "Automation to boost sales and marketing" by Rowland Moriarty and Gordon Swartz.

♦ f r o m ♦  
**HARVARD BUSINESS REVIEW**

January-February 1989

Women managers cost more to employ than men. Turnover is higher, and they are more apt to plateau or interrupt their careers. What increases women's cost to the corporation is not some inbred gender difference, however, but the clash of women's perceptions, attitudes and behavior with those of male-led corporations. With the increasing number of qualified, competitive women available for employment, how can businesses retain the best women while eliminating the extra cost of employing them? By providing them with opportunity, flexibility and family support.

From "Executives and organizations: Management women and the new facts of life" by Felice Schwartz.

♦ f r o m ♦  
**CALIFORNIA MANAGEMENT  
 REVIEW**

Fall 1988

To be effective in today's international business environment, firms must think globally and act locally.

From "Organizing for worldwide effectiveness: The transnational solution" by Christopher Bartlett and Sumantra Ghoshal.

# "If that came out of our mainframe, I'll eat it."

Once, the idea of getting printed mainframe information to look this good was just a little hard to swallow.

Understandable, considering the somewhat down-and-dirty nature of one of your average system printers.

A far cry, needless to say, from the advantages of ASCII printers. Whether it be the high quality, advanced capabilities and faster printing speeds of some. Or the significant cost savings of others.

Which is where Avatar's PA1500G, EP-Connect, PRO-Plus and Passport 3287 printer emulation products come in. Very simply, they make it possible for anyone in your organization who needs IBM mainframe information to get it quickly and easily using any ASCII printer. Everything from the IBM® Proprinters and the Epson series to the HP LaserJet II and everything in between.

They're easy to install, require very little training or MIS support and are fully compatible with

IBM 3174, 3274 and 3276 control units.

As you can imagine, the implications of all this are more than a little impressive. It means you can print mainframe data more cost efficiently than ever. It means you can print both local and mainframe applications on one printer.

But most of all, it means you can get more information into the hands of more people than you ever could before.

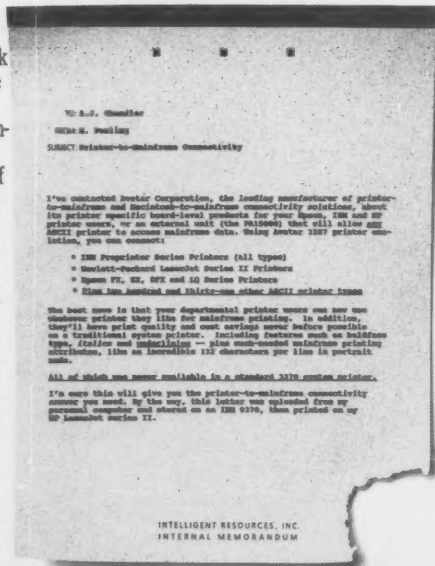
And because Avatar is the number one name in printer emulation technology, you can rely on getting the service, support and experience in IBM 3270 connectivity you expect.

For the name of your Avatar printer emulation distributor, call 1-800-289-2526, ext. 30. Or write Avatar Corporation, 65 South Street, Hopkinton, MA 01748.

We think you'll be impressed with what printer emulation can do for you. Once you get a taste of it.

IBM is a registered trademark of International Business Machines Corporation. Avatar is a registered trademark of Avatar Corporation.

Circle Reader Service Number 26



Now any printer can be used to print quality documents (left) - mainframe data. Even laser printers like the one that produced this memo.

## Avatar

next

**A wealth of integration information is coming your way in the June 5 issue. PC LAN security, cost-justifying integration projects and vertical market case studies are a few of the articles you'll find.**



## Sales Offices

Publisher/Fritz Landman

**Senior Vice President/Associate Publisher/Val Landi, COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700

**BOSTON: Northern Regional Director/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Paula Wright, COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

**CHICAGO: Eastern Regional Director/Bernie Hockwender, Midwest Regional Manager/Kevin McPherson, District Manager/Larry Craven, Sales Assistant/Kathy Sullivan, Karl Lange, COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

**NEW YORK: Eastern Regional Director/Bernie Hockwender, District Managers/Fred Lo Sapio, Sales Assistant/Linda Pippine, COMPUTERWORLD**, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

**LOS ANGELES: Western U.S. Director/Jan Harper, Southwestern Regional Manager/Carolyn Knox, Sales Assistant/Bev Raus, COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

**SAN FRANCISCO: Western U.S. Director/Jan Harper, Senior District Manager/Emmie Chamberlain, District Managers/Michela O'Connor, Alicia Sarzabal, Sales Assistants/Chris Kobayashi, Nurit Zelman, Cynthia Yurber, COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

**ATLANTA: Eastern Regional Director/Bernie Hockwender, Southeastern Regional Manager/Kevin C. Harrell, Account Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

**DALLAS: Eastern Regional Director/Bernie Hockwender, Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

**WASHINGTON, D.C.: Eastern Regional Director/Bernie Hockwender, District Manager/Paula Smith, COMPUTERWORLD**, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

**Classified Advertising Director/John Corrigan**, 375 Cochituate Rd., Framingham, MA (508) 879-0700

**Midwest Account Manager/Marie Keyes**, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171, (508) 879-0700

**New England Account Manager/Paul Bonarrigo**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

**Western Account Manager/Karen Massimino**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

**RECRUITMENT ADVERTISING SALES OFFICES: New England Recruitment Manager/Nancy Percival**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

**Mid-Atlantic Recruitment Manager/Warren Kolber**, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

**Midwest Recruitment Manager/Patricia Powers**, O'Hare Corporate Tower One, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

**Western Recruitment Manager/Barbara Murphy**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

**South-Atlantic Recruitment Manager/Kathryn Kress**, 8304 Professional Hill Dr., Fairfax, VA 22031 (703) 573-4115

**Recruitment Account Executives: New England/Andrew Rowe, Mid-Atlantic/Jay Norack, South-Atlantic/Pauline Smith, Midwest/Ellen Casey, Western/Chris Glenn**, 1-800-343-6474 or (508) 879-0700

**IDG INTERNATIONAL MARKETING SERVICES: Managing Director/Frank Cuita, COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

**West Coast Marketing Manager/Leslie Barner**, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

## Advertisers index

- 50 AIRFLOW
- 76 AMERITECH
- 43 ANDREW NETWORK PRODUCTS
- 40-41 AT&T
- 78 AVATAR CORPORATION
- 20-21 BANYAN SYSTEMS
- 70 BASF INFORMATION SYSTEMS
- 75 CHIPCOM
- 45 CINCOM SYSTEMS
- 11 CODEX CORPORATION
- 32 COMPUTER ASSOCIATES
- 34 COMPUTER COMMUNICATIONS
- 25 CW CIRCULATION
- 67 CW FOCUS
- 66 COMPUTERWORLD
- 72 DATA GENERAL CORP.
- C2, 1 DIGITAL EQUIPMENT CORP.
- 57 DUQUESNE SYSTEMS
- 65 GANDALF TECHNOLOGIES
- 53 IN-NET
- 43 INFOMART
- 39 INFORMATION BUILDERS
- 68 INSTALLED TECHNOLOGY INTERNATIONAL
- 10 INTERLINK COMPUTER SCIENCES
- C3 MICROCOM
- 29 MITEX SYSTEMS
- 17 MUST SOFTWARE INTERNATIONAL
- 60-61 NETWORK SYSTEMS
- 64-65 NOVELL
- 6 PILOT EXECUTIVE SOFTWARE
- 11, 12-13 RABBIT SOFTWARE
- 3 SANTA CRUZ OPERATION
- C4 SYSTEMS CENTER, FORMERLY VM SOFTWARE, INC.
- 35 WESTINGHOUSE
- 4-5 WYSE TECHNOLOGY

## IDG Communications/Inc.

Patrick J. McGovern  
Board Chairman

Axel Leblond  
Chief Executive Officer

William P. Murphy  
Vice President/Finance

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in 38 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S Computerworld Argentina; ASIA'S Communications World; Computerworld Hong Kong; Computerworld Scandinavia; Asia, PC Review; AUSTRALIA'S Computerworld Australia; Communications World; Australian PC World; Australian Macworld; AUSTRIA'S Computerwelt Österreich; BRAZIL'S DataNews, PC Mundo, Micro Mundo; CANADA'S Computer Data; CHILE'S Informatica, Computacion Personal; DENMARK'S Computerworld Denmark, PC World Denmark; CAD/CAM World; FINLAND'S Mikro, Tietoväike; FRANCE'S Le Monde Informatique, Distributique, InfoPC, Telecoms International; GREECE's Computer Age; HUNGARY's Computerworld SZT, PC Mikrovilág; INDIA'S Dataquest, PC World India; ISRAEL'S People & Computers Monthly, People & Computers Weekly, SBM Monthly; ITALY's Computerworld Italia; JAPAN'S Computerworld Japan, Sannicon News; MEXICO'S Computerworld Mexico, PC Journal; THE NETHERLANDS' Computerworld Netherlands, PC World Benelux; NEW ZEALAND'S Computerworld New Zealand; Computerworld Norge, PC World Norge; PEOPLE'S REPUBLIC OF CHINA's China Computerworld, China Computerworld Monthly; SAUDI ARABIA's Arabian Computer News; SOUTH KOREA's Computerworld Korea, PC World Korea; SPAIN'S Cimworld, Computerworld Espana, Commodore World, PC World Espana, Comunicaciones World; SWEDEN'S Computer Sweden, Mikro-Datans, Svenska PC World; SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S Computer News, IC Today, Lotus, PC Business World; UNITED STATES' Amiga World, CD-ROM Review, CIO, Computer Currents, Computerworld, Digital News, Federal Computer Week, 80 Micro, Focus Publications, Incider, InfoWorld, Macintosh Today, Macworld, Computer + Software News (Micro Marketworld/Labir-Friedman), Network World, PC Letter, PC World, Portable Computer Review, Publisher, PC Resource, Run/Venezuela's Computerworld Venezuela; WEST GERMANY'S Computerwoche, Information Management, PC Welt, PCWoche, Run/Run Specials.

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



**LIFE IN THE FAST LANE** Like it in the fast lane? Me, too. Don't like to waste time, like to see lines move fast. Don't like waiting, even like my food fast, like to pay for it fast, maybe even pay for it with plastic once in a while.

We're in luck. Wendy's International, Inc. and Visa USA, Inc. are combining communications technology in innovative ways to put a new twist on fast food and fast service.

At 14 Wendy's restaurants in Columbus, Ohio, customers can now use their Visa credit

cards to pay for fast food purchases. The idea is called the Visa Express Payment

## On the road

System, and Visa USA got several communications players together to pull it off.

Twice a day, Visa USA shoots updated delinquent credit card data from its San Francisco head office, via its Visanet network, across the country to Alexandria, Va., where PBS Enterprises (a division of the Public Broadcasting System) transmitters are located.

Using the vertical-blanking interval transmission frequency (those horizontal black bands you can see rolling across television screens), PBS Enterprises zaps the credit data to a Communications Satellite Corp. satellite, which relays the data down to satellite receivers at participating Wendy's restaurants. The data then shoots along a tiny local-area network to a "hot box," as Visa calls it, which is basically a nondescript black box with enough memory to hold the bad credit numbers.

Wired to the box are terminals produced by Veriphone, Inc. in Redwood City, Calif. These are the devices that Wendy's clerks run customer credit cards through.

The bottom line? The entire transaction takes only two to three seconds. The terminal authorizes and records the transaction, dispensing with the need to imprint and sign the card, and there are no carbon-copy receipts.

Neat, tidy and fast. But will it play in Peoria? Wendy's officials are tight-lipped about the success of the project, how long it will last and about the future of the concept in the fast food business.

In the meantime, the clerk is telling me my credit card is invalid; I've exceeded my spending limit. For a \$4 purchase. Life in the fast lane. — BY STAN KOLODZIEJ

▶ **Matsushita Electric Industrial Co.** has reportedly developed a new type of Josephson junction that can control the maximum value of superconducting current and the size of the junction by changing the

temperature distribution with a microheater. A Josephson junction is a voltage switching device that consists of a thin layer of insulating material sandwiched between layers of superconducting material. Because a JJ consumes less energy than conventional devices and needs less space for cooling, it promises the advent of smaller, faster computers.

## Next wave

▶ It seems that everybody's putting mainframe code on a chip.

This year, Unisys has announced its Micro A chip, a 2- by 2-in. package of mainframe-level computing placed in a desktop unit. Apollo has unveiled a workstation with reduced instruction set and parallel computing concepts set in silicon.

▶ Keep your eye on custom chip design systems. This technology will enable systems engineers to design specialized computer and networking applications right into the silicon.



"AS WE ALL KNOW, DEPARTMENTAL INTEGRATION IS STILL ONLY 90% COMPLETE."

# V.32 at 38,400 bps.



## MNP<sup>®</sup> Class 9

Because life is too short  
to use a slow modem.

We couldn't make our dial-up modems any more accurate. So we made one twice as fast. And it's available today.

Introducing QX/V.32c, the world's fastest dial-up modem. At 38,400 bps, with full-duplex CCITT V.32 compatibility over dial-up lines. Plus all the added performance and Enhanced Data Compression of MNP<sup>®</sup> Class 9. There's compatibility with V.22bis, V.22, Bell 212A and Bell 103 included, so that QX/V.32c communicates at optimum levels with modems of all speeds. And it can work in synchronous or asynchronous environments.

Speed and performance are not the only powerful features of the QX/V.32c. Its compact design is equally impressive—1/3rd the size of most competitive modems. And it comes in a rack mount version, as well.

What will you pay for our breakthrough V.32 modem? About the same as modems with only half the error-free throughput. As you can see from the chart, lower phone bills alone could pay for this upgrade.

9600 bps modem	\$6.94
QX/V.32c	\$1.74

Comparable costs of sending identical amounts of data over dial-up lines.

Find out how Microcom brought error-free V.32 to 38,400 bps levels. Call toll-free 800-822-8224 today.



Workstation  
Connectivity  
Worldwide

500 River Ridge Drive, Norwood, MA 02062 617-551-1000 Telex 710-336-7802 MICROCOM NWD

Worldwide Distribution—International FAX: 617-551-1007 USA FAX: 617-551-1006

Toll-free 800-822-8224

MNP is a registered trademark of Microcom, Inc. QX/V.32c and Enhanced Data Compression are trademarks of Microcom, Inc.

Circle Reader Service Number 27



**VM**  
SOFTWARE INC.



**SYSTEMS  
CENTER**

We've  
done  
more  
than  
change  
our name.

**We've grown from a  
brilliant specialist into  
a high-energy resource  
for multiple environments.**

As VM Software, we built an unmatched reputation for delivering powerful solutions to the problems of VM data center managers.

Today we're still #1 in VM. But we're a whole lot more: An innovator in network administration. A source of SQL/DS and DB2 database tools. A leader with Network Data-Mover products for multiple environments.

Our new name—Systems Center—reflects this expanded capability. It also signals our determination to be a continuing focal point of energy and creativity for our industry.

Through the years to come, we will continue to provide superior products for VM and networked environments. And we will continue to champion the cause of systems professionals everywhere by developing and marketing appropriate, effective technology.

Systems Center. It's a name to count on. A company to grow with. A high-energy resource for an emerging era. For more information write or call today: Systems Center, Inc., 1800 Alexander Bell Drive, Reston, VA 22091, telephone (703) 264-8000.

# Computerworld Editorial Calendar

Issue Dates		Ad Closing Dates		Editorial Features			Trade Show Distribution	
Computerworld Issue	Computerworld Focus on Integration	Color (any) Executive Reports Product Spotlights Premium Positions	B/W Display	Special Features/ Executive Reports	Product Spotlights	Computerworld Focus on Integration	Computerworld	Computerworld Focus on Integration
Apr. 17		Mar. 31	Apr. 7	Executive Report: Business Executives Assess MIS				
Apr. 24		Apr. 7	Apr. 14	Executive Report: Managing After a Merger				
May 1		Apr. 14	Apr. 21		Network Management Tools			
May 8**		Apr. 21	Apr. 28	Executive Report: Automating the Data Center				
May 15		Apr. 28	May 5		Manufacturing Technology			
May 22		May 5	May 12	Executive Report: Restructuring MIS — Distributing Resources				
May 29		May 12	May 19		Printers & Plotters			
June 5	✓ (Ad Close: May 5)	May 19	May 26	Special Feature: Systems Integration Executive Report: Workgroup Computing		Integration Themes		PC Expo
June 12		May 26	June 2	Executive Report: Technology Issues in Downsizing				
June 19		June 2	June 9		Micro DBMS		PC Expo	
June 26*		June 9	June 16	Executive Report: Restructuring MIS — Organizational Impact of Downsizing				
July 3		June 16	June 23	Open				
July 10*		June 23	June 30		Software for IBM Midrange			
July 17		June 30	July 7	Section Feature: Networking — The Human Side of LAN Use				
July 24		July 7	July 14	Executive Report: Restructuring MIS — New Organizational Models				
July 31		July 14	July 21	Section Feature: Systems & Software — Preparing For Cooperative Processing				
Aug. 7	✓ (Ad Close: July 7)	July 21	July 28		The Mac Market	Integration Themes		Network
Aug. 14*		July 28	Aug. 4	Section Feature: Management — IS For Flattened Organizations				
Aug. 21		Aug. 4	Aug. 11	Section Feature: Computer Industry — 1992: Impact of European Unity				
Aug. 28		Aug. 11	Aug. 18		The DEC Market			
Sept. 4		Aug. 18	Aug. 25	Salary Survey				
Sept. 11		Aug. 25	Sept. 1	Job Satisfaction Survey 2nd Annual Premier 100			Network	
Sept. 18**		Sept. 1	Sept. 8	Hardware Roundup: Large & Medium Scale Systems				
Sept. 25		Sept. 8	Sept. 15	Hardware Roundup: PC's, Workstations & Small Systems				
Oct. 2	✓ (Ad Close: Sept. 1)	Sept. 15	Sept. 22		ISDN Products	Integration Themes	TCP/IP Conference	Info '89
Oct. 9*		Sept. 22	Sept. 29	Special Report: MIS in the 1990s			Info '89	
Oct. 16		Sept. 29	Oct. 6		LANs			
Oct. 23		Oct. 6	Oct. 13	Executive Report: Security in Open Times				
Oct. 30		Oct. 13	Oct. 20		The Unix Market			
Nov. 6	✓ (Ad Close: Oct. 6)	Oct. 20	Oct. 27	Executive Report: Keeping Up with Service Expectations		Integration Themes		Comdex Fall
Nov. 13		Oct. 27	Nov. 3	Special Report: TBA (Comdex Show Issue)			Comdex Fall	
Nov. 20*		Nov. 3	Nov. 9***	Executive Report: IS as a Catalyst For Business Initiatives				
Nov. 27		Nov. 9***	Nov. 17		Modems & Muxes			
Dec. 4		Nov. 17	Nov. 22***	Executive Report: Computing in the Executive Suite				
Dec. 11**		Nov. 22***	Dec. 1		OS/2 Software			
Dec. 18		Dec. 1	Dec. 8	Section Feature: Management — Continuing Education For CIOs				
Dec. 25, 1989 & Jan. 1, 1990		Dec. 8	Dec. 15	Forecast '90				

\* Starch Ad Study Issue

\*\* Harvey Ad Study Issue

\*\*\* Note Early Close



# The Market Leaders...



## And, They're All Paid.

The publications depicted above are all the undisputed leaders in their markets. Editorial excellence, readership and reader preference, advertising lineage...every critical measurement shows them on top.

While they serve different audiences and different markets, they share one key characteristic. Their readers pay to receive them.

